

*Making the Most  
of One's Mind*

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JOHN ADAMS

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# MAKING THE MOST OF ONE'S MIND

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A GUIDE FOR ALL STUDENTS. BY JOHN ADAMS

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# MAKING THE MOST OF ONE'S MIND

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# CONTENTS

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	PAGE
CHAPTER I	
TAKING ONESELF IN HAND . . . . .	I
CHAPTER II	
PLAN OF CAMPAIGN . . . . .	35
CHAPTER III	
MANIPULATION OF THE MEMORY . . . . .	59
CHAPTER IV	
NATURE OF STUDY AND THINKING . . . . .	83
CHAPTER V	
MODE OF STUDY . . . . .	110

---

## *Contents*

---

	PAGE
CHAPTER VI	
READING . . . . .	153
CHAPTER VII	
TEXT-BOOKS AND BOOKS OF REFERENCE. .	178
CHAPTER VIII	
LISTENING AND NOTE-MAKING. . . . .	213
CHAPTER IX	
CONSTRUCTIVE STUDY IN TRANSLATION AND	
ESSAY-WRITING . . . . .	240
CHAPTER X	
EXAMINATIONS. . . . .	264

# *Making the Most of One's Mind*

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## CHAPTER I

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### TAKING ONESELF IN HAND

**A**MONG the Romans of the old days when a boy had finished his education, and was regarded as fit to enter upon the responsibilities of life, he cast aside the scarlet-bordered gown that boys then wore, discarded the disc of gold, silver, or leather that hung from his neck, and put on the plain black gown, the *toga virilis*, that was worn by men. In those days this entrance upon manhood was taken seriously, and was accompanied by a certain amount of ceremony. The boy was led to feel that his new estate made heavy demands upon him. No doubt it meant the removal of certain restraints. Indeed, the manly gown was sometimes called the *toga liberior*, the gown of greater freedom. But it also implied the imposition of new responsibilities. Orig-

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## *Making the Most of One's Mind*

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inally the donning of the *toga virilis* meant the liability to military service, for at first the gown was not assumed till the completion of the seventeenth year. Later in the history of Rome it was assumed at an earlier age. Indeed, the age varied considerably, but it may be safely said that the scarlet-bordered robe was not discarded before the fourteenth birthday, nor retained much beyond the sixteenth.

This variation is natural, for it is not in human nature to become a responsible person at any definite age fixed beforehand. Boys develop at different rates: some are ready at fourteen for the manly gown, while others might fittingly retain the scarlet border till well over twenty. After all, the gown was only a symbol. What it signified was that the boy had taken over his life into his own hands. He was henceforth to be, as the saying runs, "his own master," though, as a matter of fact, he was less free from outward restraint than our modern boys.

We have no ceremony when we don our first coat with tails. In truth, we greatly prefer that no notice should be taken of the innovation, that our friends, in fact, should be considerate enough to pretend that we had been dressed in that way all along. Indeed, our gradual and unostentatious adoption of the garb of manhood represents more truly than the Roman method the process of coming to what are called years of discretion. No doubt there comes a time in most lives when the person is aware that he takes

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## *A Guide for All Students*

---

himself in hand, when he assumes the responsibility for the ordering of his own life. But in many cases the person cannot name any particular time at which the act could be said to have been performed, and we know that, after all, the assumption of the manly gown symbolizes only the completion of a process that has been going on for a long time.

This process is a very interesting one and may be called, in a general way, reflection. It implies the turning back of the mind upon itself. We are familiar with those verbs that are called *reflexive*. Their characteristic is that the action begun by the subject returns back upon that subject. The subject and the object of these verbs are one. If I wash myself, there is only one person occupied in the process. The *I* that washes is the same as the *myself* that is washed. It is true that in this case it may be said that one part of the self, say the hands, washes another part of the self, say the face. But when we pass from physical actions this separation cannot be made. When I say I blame myself, it is not one part of me that blames another. It would appear that the whole of me blames the whole of me. When Cranmer, at the stake, thrust his right hand first into the flames because it had signed the document of which he was ashamed, we feel that there is something wrong with the implied judgment. We cannot separate the responsibility on a physical basis. The whole Cranmer was at fault.

Yet there is a genuine difficulty implied in all

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## *Making the Most of One's Mind*

---

reflexive action. Children can be greatly puzzled by such a sentence as "Says I to myself." Are there two persons, or only one? How can a conversation be carried on with only one person present? Even grown-up people have to recognize two aspects of the self. *I* as speaker say something to *myself* as hearer. There is only one self, but it is acting in two different ways. In one respect it is active, in another it is passive.

Now, at very early stages of life the child does not quite realize the extent of his "self." He will speak of himself in the third person. "Johnny wants a ride in Johnny's coach." By and by he begins to perceive that the Johnny he is talking about is different from every other Johnny. He has more interest in this particular Johnny than in all the remaining Johnnies in the world. He begins to realize that this Johnny who has the coach and other attractive things is a specially interesting person on his own account, apart from the things he possesses. When a child begins to pay special attention to this strange Johnny and to compare him with other children, he has reached the beginning of the conception of self. But there are here obviously two aspects of the self: the self that examines and the self that is examined. These two aspects are given different names. The examining self is called the subjective self, and the self examined is called the objective. When the subjective self appears for the first time it finds the objective self already existing.

---

## *A Guide for All Students*

---

Johnny has had many rides in his coach before he begins to turn back upon himself and find out what sort of person he is. Thus it would appear that the objective self precedes the subjective, but all that this means is that at a certain stage the self "comes to itself," or realizes the meaning of this reflexive process that is implied in selfhood.

All these considerations are of great importance to those who wish to take themselves in hand and make the most of themselves. If the subjective self, when it takes stock of the objective, is not satisfied with what it finds, it may set about dealing with that objective self in order to improve it. This is the beginning of real personal education. It is true that a schoolboy may have been at school and therefore undergoing a certain kind of education long before he realizes the two aspects of the self. But his genuine personal education does not begin till he himself takes a hand in it, with some appreciation of what it all means. Education is a process in which there are always two poles, an active and a passive. At school the teacher is obviously at the active pole, the pupil at the passive. The teacher is said to educate, the pupil to be educated. Though the pupil is said to be passive, it does not mean that he is necessarily idle, or that he does nothing. In the two words *employer* and *employee* we have a similar distinction. So far as employing is concerned, the employer is active and the employee is passive, though so far as work is concerned, the employer

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## *Making the Most of One's Mind*

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may sit in an office and do very little, while the employee may be carting coals all day. So far as education is concerned, the teacher is active and may be called the *educator*, the pupil is passive and might be called the *educatee*, but is better named the *educand*. With an ordinary thoughtless schoolboy who just does his daily work as prescribed by the teacher, we have a case in which the teacher is all educator, and the pupil all educand. But wherever we find a pupil who takes an intelligent interest in his education, that is, who not only does his daily tasks but understands why he has to do them, we have a case in which the pupil is, to some extent, an educator as well as an educand.

In the lower classes at school the pupils are almost entirely educands. In the upper classes the better pupils gradually begin to take a hand in their own education, and become more and more educators of themselves. The progress of a really good pupil through a school is a process of gradually eliminating the need for an external educator. This does not mean that the teacher becomes of less use in the higher classes, but that his use is of a different kind. It has been said by a cynical Frenchman that a cat does not caress us, but only caresses itself against us. In the same way, the really good pupil educates himself against his teacher. In other words, he uses the teacher as a means to aid in educating himself. At the early stages the teacher directs the whole of the activities of the pupil, at the final stage



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## *A Guide for All Students*

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the pupil should direct his own activities, and use the teacher as a means of using these activities to the best advantage. The duty of the teacher is clear. Thackeray tells us somewhere that the secret of wooing is to make oneself indispensable to one's mistress. The teacher's duty as educator is exactly the opposite. His aim should be to make himself dispensable. No doubt, as teacher, he may still be of the greatest possible service, but as educator he has succeeded only when his occupation is gone.

You who read this book are by that very fact proved to be at least well on the way to becoming your own educator. The book, to be sure, may have been put into your hands by some one else, who, to that extent, is your educator. But on the other hand, so far as you are interested in finding out what the book has to say that will help you to manage your studies better, you are your own educator and are using the book as an instrument. You will notice a certain parallelism between the child coming to a knowledge of the difference between the subjective and objective selves, and the pupil's coming to take a part in his own education. In both cases there is a turning back of the mind upon itself, a considering of the whole position of our relation to others, and of our possibilities. When the educand becomes his own educator, it is really a case of the subjective self taking the objective self in hand and determining to make of it something that it was not before. This implies some sort of notion of the

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## *Making the Most of One's Mind*

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aim of education. It has to be remembered that the aim of the State in education may be one thing and the aim of the individual another. No doubt, looking at the matter from the loftiest standpoint the two aims will be found to coincide. But in the meantime you who read this book are primarily interested in your own education. You want to make the best use of your opportunities, in the legitimate desire to make of yourselves the best of which you are capable.

This aim is very widely recognized to be the highest aim of education, and it is usually represented by the word *self-realization*. It is generally admitted that the educator's object is to secure the self-realization of the pupil. Some young people prefer another form of this ideal, represented by the term *self-expression*. Occasionally the two terms are used as if they were synonymous, but when they are distinguished from one another, as they ought to be, the higher ideal of the two is certainly self-realization. If they are to be marked off from one another, self-expression would seem to imply that there is a self already in existence, a ready-made self, whose only need is for expression. This ideal demands, above everything, that the self should be free from restraint. The demand of those who hold this ideal is that they should be free to lead their own life, to express what is in them, to be their true selves. So far as it is opposed to hypocrisy, and favours the honest expression of

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## *A Guide for All Students*

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our whole nature, the ideal is all right. But everything depends upon the kind of self that is being expressed. The theory takes it for granted that this self is worthy of expression.

The self-realization theory, on the other hand, implies that education is to be a process in which the possibilities of the self are to be developed. But these possibilities are for evil as well as for good. The purpose of education must be to foster the good potentialities of the self, and to stunt the evil. It may be said that to do this is to cramp the freedom of the individual soul, and it is the perception of this danger that gives to the self-expression view its power over the public mind. But those who favour self-realization do not propose to impose upon the self from without something entirely foreign to its nature. All that is proposed is to make of the self the best of which it is capable, by developing and fostering those qualities in it that make for good, while repressing those that make for evil.

But whatever may be said about the restrictive tendency of the self-realization theory as exemplified in the ordinary education by an external teacher, there can be no objections on this score in the case of those who are seeking to educate themselves. Obviously the very fact that the self has become its own educator is a proclamation of the fact that the self is having perfect freedom in directing its own development. Yet this very introduction of

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## *Making the Most of One's Mind*

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the notion of freedom calls up a point of contrast between the self-realization and the self-expression ideals. Self-expression is always emphasizing its demands for perfect freedom. There must be no restraint. The self must be left perfectly free to act according to its own dictates. But the self-realization view accepts limitations. In order that our highest ideals may be reached, it is often necessary to submit ourselves to many restraints. The highest freedom is gained by subordinating ourselves voluntarily to what we regard as wholesome restrictions. All the religious paradoxes, such as "in Thy service we find perfect freedom," are based upon a recognition of this need for voluntary subordination of our natural desires.

With all this talk of self, there is a certain danger. When the distinction between the subjective and the objective self dawns upon the child, he is interested, but he seldom talks about it. His discovery affects his attitude towards life, but not always as the result of a deliberately thought-out plan. At a later stage it is certainly desirable that the educand should consider what is going on within his soul. Self-examination is necessary to intelligent living, to say nothing of education. But there is the danger of living too much within ourselves. To be conscious of our self, to know how we stand in relation to other selves and to the outer world is of the utmost value to us. Indeed, "coming to self-consciousness" is the technical expression used by certain philosophers

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## *A Guide for All Students*

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to mean the highest point to which human thought can attain. Yet the very expression "self-consciousness" is sometimes used to indicate a quite unwholesome state of mind. A person who in a drawing-room is said to be self-conscious is one who thinks too much about himself and about what other people think of him. It is self-consciousness carried to excess and amounts to a disease. The introduction of consciousness into certain of our ordinary acts is often accompanied by a loss of power to do them as well as usual. Running down a long flight of steps is an easy matter if we think nothing about it, but if on the way we begin to consider what we are doing, we suddenly find ourselves in difficulties, and are quite apt to stumble. We often say that we cannot do certain things when there are a great many people looking on. The things are easy enough in themselves, and when we are by ourselves we do them without thinking much about them. But when we are aware that we are being watched we begin to think about how we are doing our work, and confusion follows.

If the introduction of consciousness into a process has this disturbing effect, it would appear that it is something to be avoided. Indeed, a distinguished French psychologist, Gustave Le Bon, adopts as the motto of a book called *The Psychology of Education* the words, "Education consists in causing the conscious to pass into the unconscious." Obviously this cannot mean that to be unconscious is prefer-

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## *Making the Most of One's Mind*

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able to being conscious. Consciousness in itself is essential if we are to claim the rank of human beings at all. The trouble is that it is sometimes wrongly distributed. Misplaced consciousness is a thing to be carefully avoided. The place of consciousness is in dealing with fresh things, or with things that have an immediate interest for us at any particular moment. When we are learning any new thing we must be conscious of it. We are painfully aware of every motion we make, for example, in learning to ride a bicycle. But as we go on and acquire skill we cease to notice each individual action, and confine ourselves to the general feeling resulting from balancing ourselves. All our actions are controlled by the brain. Now the brain, in a general way, may be regarded as made up of two parts, an upper and a lower. Speaking still in a very general way, it may be said that the upper brain is the seat of consciousness, while the lower brain has the control of our activities that are carried on out of consciousness. When we are learning to do anything we may be said to depend on our upper brain; when we have acquired such skill that we do not need to think about the details of what we are doing, we may be said to work with our lower brain. Thus it is not unreasonable to say that we run up and down stairs under the direction of the lower brain without calling in the upper brain at all. Everything we can do without consideration falls into the lower brain's department. Thus we do most of our spell-

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## *A Guide for All Students*

---

ing with the lower brain. It is only when a difficulty arises that the upper brain is called in for a consultation.

You are not to take all this physiology too literally. In one sense it is true that the brain always acts as a whole, yet it is sufficiently true for our purpose to accept the position that the upper brain is in the position of the head of a great commercial firm who sits in his office and directs all the new and important parts of the business, and leaves all the routine to be carried on by his subordinates. He may be said to be unconscious of all that is going on in the different departments, and yet from his place at the top he is the guiding influence that keeps everything going. If anything goes wrong anywhere in the business the head, if he is efficient, at once becomes aware of it and gives it his attention. In the same way the upper brain attends to all the new and difficult mental and physical processes, and relegates to the lower brain the looking after all the ordinary or routine parts of our living. If anything goes wrong anywhere, however, the upper brain is at once aware of it, and takes things in hand till it is safe to turn them over again to the routine-controlling lower brain.

Real living, living as opposed to mere existence, has been said to be the application of old principles to new cases. It is in the upper brain that we carry on our real living. When we are educating ourselves we keep on passing things from the upper brain

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## *Making the Most of One's Mind*

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down to the lower. The more things that we can leave to the lower brain the better. What is wanted is that the upper brain should be left to attend to the really new and important things. Were it not for this power of passing on things to the lower brain it would be impossible to make any intellectual progress. We would be all the time occupied with thinking out every individual action that our daily life demands. As it is, the great bulk of our living is carried on in the lower-brain department. The upper brain is busy all the time dealing with new matter, selecting what is useful, rejecting what is hurtful, and passing on the useful to the care of the lower brain. Once an activity has been passed into the lower-brain department it always implies waste if it is called back into the upper-brain or consciousness department, unless something has gone wrong, or unless for a definite reason the upper brain wants to examine the activity in relation to something else.

Consciousness is always being turned in some direction or other. The danger is that it may be too frequently turned back upon itself. Self-examination is necessary, and no really good work can be done unless we keep ourselves well informed about ourselves. But there is danger in keeping ourselves too much under our own searchlight. Too little *introspection*, as this process of self-examination is called, results in a dull and unintelligent personality. But too much attention to the self leads



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## *A Guide for All Students*

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to the morbid state that we have seen is known as self-consciousness. This peculiarly unpleasant state amounts to a vice, but it has to be remembered that it is an intellectual vice, rather than a moral one. The more aggressive form known as selfishness is marked by as keen a sense of the self, but in a different connexion. The selfish person is saved from excessive attention to the self by the need to concentrate upon the things that he wants to get in the interests of that self. He is not so much concerned about what he is, or what people think he is, as about what he can get for himself.

Intellectual selfishness comes as a state intermediate between self-consciousness and ordinary selfishness. It may be called self-reference, and can be observed easily in almost any conversation. We are all very much inclined to respond to every remark made to us, by a mere statement of how the thing affects us. Instead of carrying on the train of thought suggested by the remark of our friend, we are apt to tell him the train of thought his words have suggested to us. Our friend talks about his things and we talk about ours. The conversation falls into two more or less independent parts. There is a story about an old Irishwoman of a happy turn of mind who admitted that she had only two teeth in her head, but added "Thank God, they meet!" Too many of the conversations one hears in ordinary life consist of two parts that do *not* meet. One man says: "Had it not been for the dogged perseverance

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## *Making the Most of One's Mind*

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of Smith, the boat would never have been brought to land." His friend replies: "Talking of dogs, my neighbour has some young puppies that make my life miserable with their yelpings." This crude form of self-reference is not very difficult to avoid, if only we have an average amount of good feeling. But the deeper form of morbid self-consciousness is not so easy to escape.

It is indeed the besetting sin of the man who takes his own education in hand. It is so right and necessary that he should take stock of himself regularly, that he is very apt to slide into the vice without being aware of it. Yet the results of really honest self-examination are often so disillusioning as to give little encouragement to excessive self-esteem. In any case, it is obviously necessary for you to get as good a knowledge of your own powers as possible, if you are going to take up seriously the task of self-realization. In order to make of yourself the best of which your self is capable you must find out all you can about the nature of that self. One of the Seven Wise Men of Greece justified his place among the seven by a saying that is one of the most quoted of the multitude of saws that have come down to us from those old times. When Solon proclaimed his famous "Know thyself," he gave a piece of advice that is always sound, but is of special value to the young, since they are in a position to apply the knowledge of themselves that they may acquire. When the proverb tells us that man is either a fool or a

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## *A Guide for All Students*

---

physician at forty, it implies that mere experience by that age ought to have given us such a knowledge of our physical constitution as will enable us to regulate it wisely. But if the knowledge could have been acquired in the teens it would have enabled us to make applications that might have prevented evils instead of merely enabling us to do something to remedy them. In order to know ourselves it is necessary to carry on deliberately the sort of vague and unsystematic examination of ourselves that we saw took place when the subjective self set about investigating the objective self.

No harm comes from an examination of our physical powers such as we make when we consider whether we should go in for this or that form of game. We have to find what sort of "wind" we have got, how far we can trust our eye in estimating distances and speeds, whether our hand responds easily and rapidly to the suggestions conveyed by the eye. Similarly in matters of study it need have no evil results when we set about testing our native powers in order that we may be able to adopt an intelligent line of action in planning out and executing our schemes of self-realization.

In order that you may have some sort of guidance in the personal stocktaking that is essential to a proper appraisal of your power as a student, I fall back on a book called *The Schoolmaster*. It was published in 1570, its author being Roger Ascham, a famous Elizabethan teacher who was concerned in

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## *Making the Most of One's Mind*

---

the education of Lady Jane Grey and of Elizabeth herself. In his book he considers the qualities that are necessary to success as a student, and in his turn he falls back upon what Plato says in his great work known as *The Republic*. In the seventh book of *The Republic* Plato uses seven words that ought to be applicable to every one who is selected for the highest training. Ascham takes these seven words and explains what they demand from the student. I reproduce them here so that you may see how far you meet the requirements of this exacting old schoolmaster.

Εὐφύης (Euphues) : "Is he that is apt by goodness of wit and appliable by readiness of will to learning." Ascham goes on to demand under this head a sweet and strong voice, a comely face, goodly stature and a commanding presence.

Μνήμων (Mnemon) : "Good of memory, a special part of the first note, Euphues, and a mere benefit of nature, yet it is so necessary for learning . . . as without it all other gifts of nature do small service to learning."

Φιλομαθής (Philomathes) : "Given to learning; for though a child have all the gifts of nature at wish, and perfection of memory at will, yet if he have not a special love to learning, he shall never attain to much learning."

Φιλόπονος (Philoponos) : "Is he that hath a lust to labour and a will to take pains. For if a child have all the benefits of nature, with perfection of

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## *A Guide for All Students*

---

memory, love, like and praise learning never so much, yet if he be not of himself painful, he shall never attain unto it."

**Φιλήκοος** (Philekoos) : "He that is glad to hear and learn of another. For otherwise he shall stick with great trouble, where he might go easily forward; and also catch hardly a very little by his own toil, when he might gather quickly a good deal by another man's teaching."

**Ζητητικός** (Zetetikos) : "He that is naturally bold to ask any question, desirous to search out any doubt, not ashamed to learn of the meanest, not afraid to go to the greatest, until he be perfectly taught and fully satisfied."

**Φιλέπαινος** (Philepainos) : "He that loveth to be praised for well-doing at his father or master's hand. A child of this nature will earnestly love learning, gladly labour for learning, willingly learn of other, boldly ask any doubt."<sup>1</sup>

Quintilian, in his book on Oratory also gives a few of the points that are essential to success in study. He puts in the forefront memory and imitation, but he also lays great stress on the last quality that Ascham mentions, love of praise. "Give me," says Quintilian,<sup>2</sup> "the boy whom praise stimulates, whom honour delights, who weeps when he is unsuccessful. His powers must be cultivated under the influence of ambition; reproach will sting him to the quick;

<sup>1</sup>*The Schoolmaster* (Arber's edition), pp. 38-42.

<sup>2</sup>*Institutiones Oratoriæ*, Book I, Chapter III, s. 6.

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## *Making the Most of One's Mind*

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honour will incite him; and in such a boy I shall never be apprehensive of indifference."

Quintilian is a little doubtful about boys who learn easily at the beginning. He thinks they are inclined to be impudent, and incidentally he shows that he is not so keen on "zetetikos" as is Ascham. Still, the English schoolmaster too has his doubts about the quick learner. He goes out of his way to distinguish between what he calls hard wits and quick wits, and it is not difficult to see that he has a bias in favour of the hard kind. This is how he describes them:

"Hard wits be hard to receive, but sure to keep: painful without weariness, heedful without wavering, constant without newfangledness; bearing heavy things though not lightly, yet willingly; enduring hard things though not easily, yet deeply, and so come to that perfectness of learning in the end, that quick wits, seem in hope, but do not in deed, or else very seldom, ever attain unto."<sup>1</sup>

This distinction between the two kinds of wits leads to another that is worthy of your attention in estimating your qualities. We are all familiar with the word *temperament*, and are aware that people often excuse themselves for certain irregularities on the ground that they are the outcome of temperament. We hear a great deal about the artistic temperament and its vagaries, and many people wonder what is meant exactly by this and other temperaments. In a very general way temperament may be described as the physical basis of character. So far

<sup>1</sup>*The Schoolmaster*, p. 35.

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## *A Guide for All Students*

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as our character or disposition is determined by the nature or state of our bodies, it may be said to show the effect of temperament. The old physiologists had the theory that the state of the body had a direct and *specific* effect upon mental states. To some degree the view is still held, but in a very different way from that of the ancient doctors with their crude knowledge of anatomy and physiology.

*Temperamentum*, in Latin, means a mixing in due proportion, and what the old doctors thought of was the mixing of certain fluids in the body. There was first of all the blood, then the colourless lymph, next the bile, and lastly a particularly virulent kind of bile called the black bile. According as one or other of these fluids or "humours" got the upper hand in the body, did the person belong to one or other of the four recognized temperaments—the sanguine, the phlegmatic (or lymphatic), the choleric, the melancholic. Certain qualities were assumed to belong to each of these temperaments. The characteristics of the sanguines are love of movement, vivacity, light-heartedness, hopefulness, rashness, impatience. The phlegmatics are marked by slowness of movement, dullness, incapacity for sustained effort, placidity, lack of fuss. The choleric show ambition, stubbornness, love of work, courage; while the marks of the melancholics are depression, sadness, dark-sidedness, reflectiveness, and humility. You need not trouble overmuch to determine which of these temperaments can claim you for its own, since we

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## *Making the Most of One's Mind*

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have all got touches of all of the temperaments, and we sometimes seem to pass from one to the other according to certain changes in our health. Indeed, a distinguished German psychologist, Professor Lotze, holds that we all pass through the whole of the temperaments in the course of our ordinary life: we begin as sanguines in childhood, pass on to the melancholic stage during youth, become choleric in our mature years, and end up as phlegmatics.

There is, however, another classification of temperaments that is more worthy of your attention. According to the rapidity with which we respond to stimuli we are classed as sensories or motors. The distinction is made on a basis of nerve reaction, into which we need not enter here. It is enough to note that the sensory temperament is marked by a relative slowness of response. People who are sensories are inclined not to respond at once to any suggestion, but to take it into consideration and decide upon it at a later stage. The motors, on the other hand, are inclined to respond by action at once. For them knowing is but the vestibule of doing. They jump to conclusions. An attempt has been made to correlate these temperaments with sex and to show that women as a whole are motors, while men as a whole are sensories. But, if true at all, this generalization is true only in a very limited degree. It appears that at school age there may be something in it, and that this may account for the bad character boys have as compared with girls of the same age in the



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## *A Guide for All Students*

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lower parts of the school. At the early stages boys are certainly more backward than girls, but in the higher classes at school this distinction no longer holds.

It is worth your while making up your mind whether you are a sensory or a motor, as it may enable you to compare yourself more usefully than you otherwise could with your fellows, and to determine more wisely how to treat yourself as a student. If you find yourself markedly sensory it may be worth your while to try to speed up your decisions, while if you suspect yourself of being markedly motor you may have to cultivate the habit of suspending judgment, not to speak of action.

There are other qualities of your mental equipment that you should know about. Memories, for example, differ greatly in their way of working. Some people have what are called verbal memories and retain with ease any form of words. Others have what may be called rational memories and retain easily any facts that have a cause-and-effect relation to each other. Some seem to remember things best by their relations in time, others by their relations in space. You should know what sort of memory yours is, and whether it has any peculiarities. So with your other powers. You should note whether you have a tendency to picture out what you read, or whether you prefer to get at the sense as rapidly as possible without making any mental pictures. Most people have a preferred sense, too. That is, some

Sensory  
motor  
mind

Memory

Mental  
pictures  
Preferred  
sense

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## *Making the Most of One's Mind*

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prefer to learn through the eye, others like to learn through the ear, still others through the sense of touch. The first kind are called visuals, the second audiles, the third tactiles. This does not mean that the visuals learn only by the eye, and the audiles only by the ear, but that each *prefers* to have his information conveyed through his favourite sense.

In practice there are three main ways of acquiring knowledge: observation, intercourse and reading. We may use our senses to discover the nature of our surroundings, and reason about what we observe. We may talk to people who know more than we do, and from them acquire information. Or we may turn to books that have been written with the express purpose of communicating knowledge. In observation and intercourse we usually learn incidentally. By using our senses and by talking to our neighbours and friends, we cannot help learning something, even though we have not set out to acquire knowledge. What we learn is a sort of by-product that comes without being actually sought for. The mere process of living always implies the picking up of knowledge in a more or less haphazard way. We are educated at school, no doubt, but we are also being educated all the time by our ordinary course of living. The difference is that at school we are taken in hand by a person whose business it is to educate us, whereas in ordinary life we are educated by our surroundings without anyone having any special intention to act

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## *A Guide for All Students*

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as our educator. We are, as we say, "licked into shape" by the circumstances of life.

In our deliberate attempts to acquire knowledge we may depend on intercourse, or we may fall back upon books. While we are at school the two forces, living intercourse and reading, are both essential parts of our education. But pupils differ according to their preferences. Some learn much more easily from the word of mouth instruction that they get from their teacher; others profit more by reading quietly for themselves the text-books on the different subjects. The first kind of pupils, when they leave school and still desire to carry on their studies, are inclined to attend lectures by preference, while the second rely more upon reading. Naturally the audiles incline to accept the lecture system, while on the whole the visuals prefer to get their information from books. But there are other matters that enter into the problem. The less self-reliant student naturally prefers the lessons of an actual teacher to the unsympathetic pages of a mere book. You have then to examine yourself rather carefully so as to determine which line of study is best suited to your need. You must find out to which class of students you yourself belong.

You will note that all these points that you are invited to observe about yourselves are matters of fact. Accordingly they should not lead you into temptation in respect of conceit. Indeed, if you are honest with yourself, and anything else is fatal to

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## *Making the Most of One's Mind*

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success as a student, the result of your investigations is more likely to be depressing than otherwise. A careful estimate of your own powers will almost certainly make you appreciate defects in yourself of which you would otherwise have been unconscious, and merits in others which would under different circumstances have escaped your observation. All the same, there is undoubtedly a tendency to become self-conscious involved in all this. The best way in which this tendency may be countered is by acquiring an interest in the subject-matter of your studies. For a time your honest study of yourself may lead to a somewhat unwholesome concentration of consciousness upon yourself. But if you proceed to apply, as soon as possible, the knowledge you have acquired of yourself to the practical problems of your education, you will get rid of the superfluous consciousness by transferring it to the difficult parts of the problems you are studying. This looks as if you were being encouraged to study yourself and then forget all about what you have learnt. You seem to be invited to imitate the man in the Bible who beholds his natural face in a glass, "for he beholdeth himself, and goeth his way, and straightway forgetteth what manner of man he was." But though in the interest of the work of study you forget about your temperament, your index of memory, and your preferred sense, you are applying all the time the results of your knowledge of yourself. Your knowledge is changed into power. You become a more skilful

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## *A Guide for All Students*

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self-manipulator because you know better the self to be manipulated. And the more skilfully you use this knowledge, the less the danger of your falling into the vice of self-consciousness.

But this vice may take the cruder form in which the subject-matter of our studies acquires an undue importance. The amount of knowledge that we can acquire of the outer world is at best pitifully small, yet some of us become self-conscious in view of our attainments. We may regard the knowledge we have won as in itself of great commercial value, and accordingly gloat over our mental gain as a miser does over his hoard. This false point of view results from a wrong notion of the nature of knowledge that we shall deal with later. It is not very difficult to avoid. But the more insidious form needs all our care, and in spite of our best endeavours is apt to catch us unawares. We may regard the knowledge we have acquired as important enough in its way, but may value still more the form in which we have retained it. We are tempted to value it not so much because it is knowledge as because it is *our* knowledge. We become intellectually conceited, and it does not improve matters that we often combine with our conceit a knowledge that we are conceited, while we make a certain show of hiding our conceit. Plain common-sense people dislike this compound state of mind so much that they have gone out of their way to invent a special name for it. A man who has fallen into this vice is called a "prig," and

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## *Making the Most of One's Mind*

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the state itself "priggishness." It is difficult to define a prig, but the leading idea underlying the term is a sort of complacent intellectual self-righteousness that is exceedingly unpleasant to other people. A man who was once asked to define the term said that he could do so only by comparing it with another: A prig is one who has too much self-respect, a bounder one who has too little.

A criticism sometimes directed against the self-made man is that he is too proud of his maker, a criticism that the reader of this book should take to heart, since a man who seeks to educate himself is really one who hopes to be by and by a self-made man. Yet the first lesson to be learned by one who would educate himself is how best to use the help that others may give. The term self-educated is too frequently restricted to those who have had no help from others: it is too often supposed to mean a person who has not been able to go to either school or college. Some people even pride themselves upon their freedom from the cramping influences of a conventional education, and agree with the sentiment expressed by William Blake, the English mystic, in his egregious rhyme:

"Thank God I never was sent to school,  
To be flogged into following the style of a fool."

But, as we have seen, schools and teachers may be used by the pupil for his own advantage, without in any way sacrificing his independence. A man may become as much a slave to a book as to a teacher.

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## *A Guide for All Students*

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The really wise person uses all the means at his disposal for furthering his education. A teacher is as much an instrument in the hands of a self-educator as is a book. In point of fact, when all is said, it has to be admitted that all real education is self-education. Unless we take a hand in our own education we can never attain to the best possible results.

A French teacher called Jacotot spent a great deal of time in showing how useless and unnecessary a teacher is—but he kept on teaching all the same. He and many others have plenty of examples to bring forward of distinguished men who have attained success without any instruction from professional teachers. But these brilliant men succeeded, not because they had no instruction, but in spite of this lack. Let us take the evidence of the famous French naturalist J. Henri Fabre, when he is speaking of his studies in mathematics:

“I was denied the privilege of learning with a master. I should be wrong to complain. Solitary study has its advantages: it does not cast you in the official mould; it leaves you all your originality. Wild fruit, when it ripens, has a different taste from hot-house produce: it leaves on a discriminating palate a bitter-sweet flavour whose virtue is all the greater for the contrast. Yes, if it were in my power, I would start afresh, face to face with my only counsellor, the book itself, not always a very lucid one; I would gladly resume my lonely watches, my struggles with the darkness whence, at last, a glimmer appears as I continue to explore it; I should re-traverse the irksome stages of yore, stimulated by the one desire that has never failed me, the desire of learning.”<sup>1</sup>

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<sup>1</sup>*The Life of the Fly*, English Edition, p. 292.

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## *Making the Most of One's Mind*

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Yet honesty compels the old naturalist to recall his disappointment with the mere book:

"The book is just a book, that is to say, a set text, saying not a word more than it is obliged to say, exceedingly learned, I admit, but, alas, often obscure! The author, it seems, wrote it for himself. He understood; therefore others must. Poor beginners, left to yourselves, you manage as best you can! For you, there shall be no retracing of steps in order to tackle the difficulty in another way; no circuit easing the arduous road and preparing the passage; no supplementary aperture to admit a glimmer of daylight. Incomparably inferior to the spoken word, which begins again with fresh methods of attack and is ready to vary the paths that lead to the open, the book says what it says and nothing more. Having finished its demonstration, whether you understand or no, the oracle is inexorably dumb. You re-read the text and ponder it obstinately. You pass and repass your shuttle through the woof of figures. Useless efforts all: the darkness continues. What would be needed to supply the illuminating ray? Often enough, a trifle, a mere word; and that word the book will not speak.

"Happy is he who is guided by a master's teaching! His progress does not know the misery of those wearisome breakdowns."<sup>1</sup>

Here we have the case very fairly stated. There are advantages on both sides, which is fortunate, since most of us can now have the advantage of a teacher's help if we really want it. Most of those who read this book are in the position of having an instructor or instructors in their studies. We must learn how to make the best use of them. We must not rely upon them too much. Professor Laurie, in

<sup>1</sup>*The Life of the Fly*, English Edition, p. 330.



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## *A Guide for All Students*

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speaking of the advantages of poor children in that they had to rely upon their own efforts, appealed to the well-to-do to make such arrangements for throwing their children on their own resources as should give to them "some of the advantages of the gutter." These are advantages easily gained by the intelligent student. All he has to do is to resolve to use his teachers only in so far as he finds it necessary to do so. No doubt some teachers take up an altogether wrong attitude towards their pupils, and the pupil must accordingly put the matter straight by using the teachers in such a way as to develop his own nature in the freest way possible.

It is no part of a teacher's business to insist upon making his pupils like himself. It is only Deity that dares say: "Let us make man in our image, after our likeness." Most teachers are modest enough to recognize this, but some are not. It is the really good teachers who are willing that the clever pupil shall be clever in his own way. As we have seen, the true teacher attains his highest ends by making himself no longer necessary to his pupil. The important thing for the pupil is to be ready to take up the freedom that the teacher allows. Only as this freedom is accepted can the pupil retain that bitter-sweet flavour that Fabre and others value. Just in proportion as the teacher ceases to direct must the pupil take up the control of his own education. But it must never be forgotten that a teacher may have ceased to direct, without ceasing to be a very valu-

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## *Making the Most of One's Mind*

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able help to the pupil who is conducting his own education.

The difference between school and college may be said to lie just in this, that in school the pupil is all the time more or less of an educand, whereas at college he is entirely his own educator. At school the teacher prescribes certain portions to be learnt, and in various other ways shows that he takes upon himself the responsibility of the educative process that is going on. At the university the professor undertakes the responsibility of presenting his matter in the way best suited to what he considers to be the needs of his students, but to them he leaves the responsibility of learning. In the German universities the students lay great stress on what is called the *Lernfreiheit* or freedom of learning. They claim to be free to learn when and how and where they please. They may attend their classes regularly or irregularly just as they choose. They can acquire their knowledge from books or from lectures or from intercourse with others, just as they find best for their special needs. The university insists upon their showing at the end of their course that they have acquired the minimum amount of knowledge required to obtain a degree, and if the student has used his *Lernfreiheit* unwisely he has to go without his degree. Going from school to university under these conditions is clearly an equivalent on the intellectual side to donning the *toga virilis*. And just as the age at which this toga was assumed differed in indi-

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## *A Guide for All Students*

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vidual cases so the stage at which the pupil passes from the partly educand partly educator stage into the purely educator stage varies in individual cases. Many boys have become purely self-educators long before their school days are over, while not a few do not reach this stage at all, even at the university.

The very fact that you are reading this book shows that you have advanced at least a good way towards the stage of being your own educator. If you still have teachers to help you, you will do well to make of them the best use you can. It is worth while to remind you that it is not the business of your teachers to save you trouble. In many cases their chief duty is to make you take trouble. But they can and often do save you from taking useless trouble. You may think of doing a thing in a particular way, and if left to yourself you would probably succeed in attaining your end, and yet that way may be a bad one. It is better than none at all, and self-educated men sometimes become proud of the very badness of their methods. But this surely is unwise. It is no loss of dignity and no interference with your individuality to be told by a more experienced person which is the most economical way of doing something that you want to do. It is here that the wise self-educator shows his wisdom by getting all the advice he can before entering upon any bit of work. He may or may not accept the advice offered—therein lies his freedom—but he will at least enter upon his undertaking with the fullest knowledge

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## *Making the Most of One's Mind*

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available of the various ways in which his end may be attained. In the following pages will be found many suggestions, the result of long and interesting experience of studying and of students. It will be for you to give these suggestions your honest attention, and to decide which of them you feel called upon to adopt. You are no doubt bored at the continual repetition, by those whose business it is to speak for your good, of the threadbare saying that there is no royal road to learning. But there are many different kinds of roads, and since you have to walk one or other of them it is worth your while to make a wise selection at the beginning of your journey.

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## CHAPTER II

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### PLAN OF CAMPAIGN

**I**T is as essential in study as in warfare to have a satisfactory plan of campaign. Irregular desultory work never produces the same effect as that which is carried on with a definite purpose and on clearly thought-out lines. Our plans fall naturally into two groups, the one dealing with the subjects to be studied, and the other with the distribution of the time we can devote to each study. At school, and even at the university, the general lines of our subject-matter are laid down for us from above. We are told in broad outlines what to learn, though there is certainly a great deal of room left for personal organization of the details of this subject-matter. With this we shall deal at a later stage. Here we are specially interested in the distribution of our time.

We are all familiar with the time-tables that we find at school, on which the week's work and the work for each day are clearly set out. As pupils in a school we must conform to the time-table, so there

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## *Making the Most of One's Mind*

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is no more to be said on that head. But the school time is not the only time we give to study. Every pupil past the preparatory stage has, and ought to have, a certain amount of study to be done in his own time and at his own pace. This time must fit in, of course, with the requirements of the school. That is, if the school makes heavier demands in Latin than in Mathematics, then we must give a proportionately larger amount of home study to Latin. Further, the subjects to be studied each evening will be determined by the subjects to be taken up in class next day. The result of all this is that we must make up a sort of time-table for our home study, and it will be found necessary to make this time-table fit in with that of the school. But the moment you sit down to write out such a table you will find a certain difficulty. You will discover that the total amount of time needed for preparation varies from evening to evening. Some evenings are light and others are heavy. You will find that the teachers are quite aware of this. But though they do all they can to secure a fair degree of uniformity in the amount of work demanded each evening, it is impossible to arrange matters in the symmetrical way they would like. Accordingly, you will see it to be necessary to make not the evening but the week the unit on which you draw up your time-table. That is, you must see to it that if Tuesday evening, for example, is a specially heavy one, you do some of Tuesday night's work on Monday night. By this

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## *A Guide for All Students*

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way of give and take you will find it possible to make ends meet in a reasonable way, instead of loafing on the easy evenings and overworking on the heavy ones. You must be responsible for your evening time-table, just as your teachers are responsible for the school one. It is accordingly rather important that you should take account of the nature of a time-table, so that you may be able to behave intelligently in making and using one. The following points deserve your attention.

I. In drawing up your time-table you must not be too heroic. When you first sit down to consider the whole question you will probably feel yourself in a glow of noble determination to do the thing very thoroughly. It is like making up one's mind to get up very early next morning. For the time being you are warm and comfortable and full of resolution. Nothing seems too drastic. You may as well be thorough about it when you are at it. Mr. H. G. Wells puts the case very graphically in his *Love and Mr. Lewisham*, where he gives an account of the inhuman time-table drawn up by that enthusiastic young person. Naturally he could not live up to it, and the trouble is that a time-table that falls through has its disastrous after effects. In order that you may live up to your time-table you must estimate very carefully beforehand your capacity for work. You must try to gauge this pretty accurately, for there is almost as much danger in under-estimating as in over-estimating your powers. No doubt it

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## *Making the Most of One's Mind*

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would be easy to make sure of overtaking all you laid out for yourself if you deliberately put your demands well below your powers. But the result of this working below our own natural level is extremely bad. It involves no call for strenuous effort. Everything goes smoothly and easily. We hardly rise above the level of a vegetable.

We must have ideals, otherwise we shall have no incentive to work. When Browning writes:

“Ah, but a man's reach should exceed his grasp,  
Or what's a heaven for?”

he suggests the essential quality of an ideal, which is that it can never be fully attained. When we work to attain something that we know to be well within our reach we are working for an end, not for an ideal. This appears a sensible way of working, and it cannot be denied that at first sight it seems an unsound policy to encourage people to work for an ideal, if we start with the assumption that an ideal is unattainable. Indeed, it looks as if the beginning of this section on time-tables was written just to warn you against undertaking something that you could not succeed in carrying out. But we must look more closely at what underlies this conception of the ideal. In your studies you may have come across the expression “the mathematical limit.” If we take  $\frac{1}{2}$ lb.,  $\frac{1}{4}$ lb.,  $\frac{1}{8}$ lb.,  $\frac{1}{16}$ lb.,  $\frac{1}{32}$ lb.,  $\frac{1}{64}$ lb.,  $\frac{1}{128}$ lb.,  $\frac{1}{256}$ lb., and add them all together we get very nearly a whole pound, in fact within a two-hundred-and-fifty-sixth part of a pound. This is near enough for all prac-



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## *A Guide for All Students*

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tical purposes; but still, if we go on adding always another fraction exactly half of the one preceding, we get nearer and nearer to a total of exactly one pound. One pound is here the mathematical limit of the sum of this series. But to reach that limit we would need to go for ever adding fractions, which enables us to understand the definition of the mathematical limit as "that which we can approach as nearly as we please, but never actually reach." This corresponds to our notion of an ideal. You remember that Goldsmith, referring to the horizon, has the suggestive lines:

"That, like the circle bounding earth and skies,  
Allures from far, yet, as I follow, flies."

So the ideal allures from far, and when pursued proves as unattainable as the horizon. But it does not cease to allure. Therein lies its power. Attainment satisfies us and we cease to strive. The unattained always attracts us: it is a perpetual challenge. To be sure, if it could be *demonstrated* to our satisfaction that it was not only unattained but unattainable, it might lose its charm. But the ideal is not unattainable in that absolute sense. We can never reach it, but we can approach it as nearly as we please. Thus we are attaining all the time without ever having attained, and the ideal retains to the end its wholesome allurements.

II. Applying this theory of the ideal to our timetable we find that it will be enough to make the amount of time to be given to study an end, and not

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## *Making the Most of One's Mind*

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an ideal. We have to fix a number of hours that we know to be within our power, and not start with the intention of working the maximum number of hours that our organism will stand. But though the number of hours should be chosen on the principle of the mere end, the kind of work done during these hours will give ample opportunity for the operation of the ideal.

In determining the number of hours to be included each week in our home time-table, various things have to be taken into account. To begin with, the number of hours devoted to study at school or college will have a determining influence. There is a traditional belief that an eight hours' working day is a reasonable arrangement. So that if you have five hours' work at school there should remain three hours to be accounted for at home. But if you have a six hours' day at school you will probably find that you have still need of three hours at home to keep up with your class work, and with a healthy boy or girl a nine (or even a ten) hours' day is not dangerous, though it certainly means strenuous work. The question of health is of the utmost importance, and if your parent or your medical attendant tells you that a nine (or ten) hours' day is injurious, then, of course, you must accept the decision and make your time-table accordingly. The important thing is to determine the total amount of time at your disposal for home study and make the best use of that. Other considerations besides health must be taken into ac-

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## *A Guide for All Students*

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count. There are some social duties that demand a certain amount of time—particularly in the case of girls. But this claim needs to be carefully scrutinized. Some young people are only too ready to take a very serious view of their social responsibilities, just as others are inclined to take an unduly pessimistic view of the effect of study on their health. Your conscience and your doctor must decide between them about the relation between work and play, while your parents must help your conscience to determine how much time you owe to society. If you are entitled to wear the *toga virilis* and are still a student, you will be well advised to keep society on pretty short rations in the matter of your time.

III. With regard to the distribution among the various subjects of your whole available time for home study, you must rely upon your own experience and your own judgment. It is well known that certain subjects, for example, Mathematics and Latin Prose, are more difficult, and therefore demand more time than others. Generally speaking, therefore, you will give to such subjects a bigger share of your time than to others. But here you must take account of your own special capacity and tastes. It may be that you are specially good at mathematics and find constitutional history much harder. In that case history should get the preference in the time-table. Further, it sometimes happens that though you are not good at a certain subject you may have been a longer time at it than have

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## *Making the Most of One's Mind*

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the others in your class, and thus you may be for a term or two in advance of the rest of the class in that subject. Clearly you could afford, in such a case, to cut down the time you would ordinarily give to that subject and devote it to some others in which you happen to be weak.

IV. Having determined the total amount of time per week to be given to the various subjects, you have next to settle in what order these subjects should occur on your time-table, and how they should be distributed throughout the week. Here there are certain general principles that may give you some help.

(a) The more difficult subjects should always be taken when the mind is freshest. This is usually at the beginning, or very near the beginning, of a period of study. Accordingly, you will be well advised to put at those times the subject that you find most difficulty in mastering. But this principle should be taken in connexion with another. It sometimes happens that you dislike some subject, though you have no great difficulty in dealing with it. Speaking generally, we dislike most those subjects that are for us the most difficult. But if for any reason we find a subject easy enough in a way, but unpleasant for us, then we should put that in the forefront. So with the end of a study period. That is the place for the easiest subjects, but if there is some subject that we find hard but still take a positive pleasure in, then it may be put at the end, where it

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## *A Guide for All Students*

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stands as a sort of inducement to get at it by working off the less pleasant matters that precede it. Further help in deciding the order in which subjects should be studied will be found from a consideration of what will be said about fatigue a little later.

(b) It is found that in most cases the oftener a subject is taken in the week the better chance it has of getting justice. Thus, if you can afford only two and a half hours per week to a given subject, say French, this time might be divided into one hour on Monday, half an hour on Wednesday, and one hour on Friday. Or the time might be divided in the simple form of half an hour every day for five days. This latter distribution is found to be the more profitable. You seem to learn something between lessons, even though you may not open your book from one lesson to another. On the other hand, some subjects require a certain amount of preparation of materials for each lesson. Thus if you had two hours a week to devote to drawing, it would probably be better to have them in two separate hour-periods rather than in four half-hour-periods. The time spent in putting out and putting away the drawing materials would thus be lost only twice a week instead of four times.

(c) While the hardest subjects should generally come first and the easiest last, there is room for a certain alternation of the easy and the difficult. After a very hard subject a very easy one may be well used as a sort of rest after the strain. Still we

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## *Making the Most of One's Mind*

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must keep in view what we have said under (a) on this point. But whatever may be done in the way of alternating the easy and the difficult, there certainly ought to be an alternation according to the different kinds of subjects. Thus algebra should be followed by something quite different, say French; history might be followed by geometry, and geography by composition. It is obvious that this principle of alternation might be quite well combined with the alternation of the easy and the difficult, to say nothing of the repulsive and the attractive.

V. One great danger in the use of the time-table is rigidity. It is difficult to finish our work in each subject at the exact moment when a new subject is due. To obviate this difficulty it may be suggested that a small period of say fifteen or twenty minutes should be set apart at the end of each evening's work as a sort of reserve time to finish off any little thing we may have been forced to omit in any of the ordinary periods. But this plan is dangerous. The recognition of a fixed emergency time gives a sort of justification for not quite finishing the work at any period, and the tendency is to have a bad balance left over from every period. It is probably better to allow an occasional extension of one subject into the period of another. This is very bad, no doubt, but the important thing is that it is *felt* to be bad at the time. We cannot avoid feeling conscience-stricken when we know that we are favouring one subject at the expense of another. All subjects may claim an

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## *A Guide for All Students*

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equal right in the reserve period. But the very fact that we know we are using Geometry time for French work makes us uncomfortable, and therefore drives us to avoid such incursions unless under genuine stress and strain. You must not allow pedantry to stop you to the moment, when a few minutes more might produce all the difference between complete and incomplete preparation; but if you cultivate a tenderness of conscience about overlappings you will be able to preserve an adherence to your times that is intelligent without being slavish. If your conscience is in good working order you may experiment with a reserve period, with the full resolve to use it as seldom as possible as an emergency extension for any one subject, and as often as possible as a revision period for each subject in turn. If you cannot depend on your conscience, avoid having a reserve period in your time-table.

At the present time a great deal of attention is given to the question of over-pressure in schools. It is probable that with most young people there is more danger of under-pressure than over-pressure. It is an unwholesome thing to be continually thinking about one's health, and it is not desirable to encourage young people to think that their main business is to make sure that they do not do too much work. All the same, in order that you may have the proper information to guide you in managing your work, it is worth while telling you some of the facts that have

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## *Making the Most of One's Mind*

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come out in the many investigations that have recently been made into the nature of fatigue. Sometimes we hear of mental fatigue, as if it were different from other kinds of fatigue. But it would appear that the effects produced by mental work are very much the same as those produced by any other kind of work.

To begin with, we are not to regard fatigue as something to be avoided. After honest work we ought to be fatigued. What we should be afraid of and try to avoid is over-fatigue. The difference between the two may be said to be that over-fatigue demands special means to remove it. If after a piece of work you are tired and, as you are apt to say, "worn out," you go to bed and have a good sleep and waken up refreshed, you have been merely normally fatigued. But if when you go to bed you are, as we sometimes say, too tired to sleep, or if when you do sleep you waken up still tired, and the tiredness hangs about you all the next day and interferes with your effectiveness in work, then you have been over-fatigued. Again a warning is needed. You must not be always on the look out for symptoms of tiredness. If they need to be looked for they may be safely neglected. On the other hand, there are those who find the symptoms all too easily. These are they of whom it is contemptuously said, "they were born tired."

What you are mainly concerned with is the effect



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## *A Guide for All Students*

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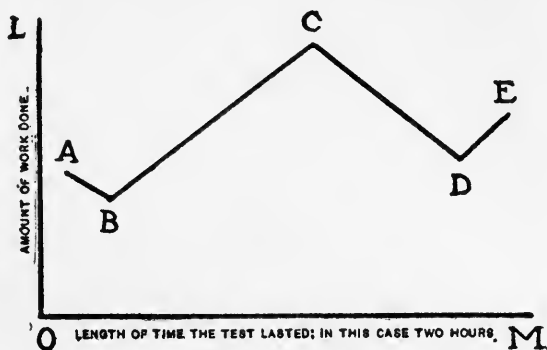
of fatigue upon your work. Now it is worth while noting that the moment you start upon a piece of work the fatigue effect begins to set in. It is not noticeable for quite a long while and does not make its influence felt till the work has exhausted a certain amount of your energy. But it goes on increasing in amount and tends to reduce the effectiveness of your efforts. But there are other influences at work at the same time. There is first what is called the practice effect, which represents the increased skill we acquire in doing anything by the very practice we get in doing it. Suppose we are working out equations in algebra, we acquire by practice greater ease in manipulating the material as the lesson goes on; and the same is true of such a different operation as memorizing the irregularities of the French verb. The other force at work produces what may be called the "swing" effect. Apart from the skill we attain by practice in a particular operation, we acquire, as we go along, a certain swing that carries us on. This is what we mean when we say that we have warmed up to our work.

Now the curious thing is that at the beginning of a period of study all three forces start work, and all three effects go on increasing as the study proceeds. But at first the fatigue effect makes little progress, while the practice effect and the swing effect progress rapidly. By and by, however, the practice and the swing effects reach their maximum and cannot become greater, while the fatigue effect steadily

## Making the Most of One's Mind

increases. At length a time comes when the fatigue effect more than counterbalances the other two and the effectiveness of study begins to diminish. It goes on diminishing till by and by it becomes unprofitable to carry on the work.

The following diagram illustrates what takes place in a period of two hours' work. Beginning at A the



FATIGUE CURVE.

Reproduced from Binet and Henri's *La Fatigue Intellectuelle*, by kind permission of Messrs. Schleicher Frères, Paris.

effectiveness of the work, so far from increasing rapidly, begins at first by actually decreasing. This results from the distraction that we experience at the beginning of a lesson. We are busy fighting against all the other interests that claim our attention. But when we have settled our account with the matters that occupied our minds just before the lesson began, and that have made a fight for their place in our minds before they finally give way to the matters we are studying, there is a rapid increase in the effec-

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## *A Guide for All Students*

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tiveness of our work, owing to the growing practice and swing effects. This goes on up to C, at which point the fatigue effect is able just to counterbalance the combined forces of the other two. After that there is a steady fall to D. In the ordinary course this fall would continue, but when it gets close to the end of the study period we are stimulated a little by two things. First there is the prospect of a speedy release from toil, and this cheers us up. Then there is the working of our conscience that tells us that our time is now very short, and therefore there is the more need for effort. The result is a little spurt at the end, which has been compared to what the old postilions used to call "the spurt for the avenue," meaning the little reserve force that they husbanded in their horses during a long journey so that they might make a creditable appearance as they drove up to the door of the grand house.

We see, then, from the "curve of fatigue," as the diagram is called, that there is always a loss at the beginning of a new lesson, because of the distraction and because the practice and the swing effects take a little time to make themselves felt. In consequence you may think that it was bad advice to ask you to take five half-hour lessons rather than two lessons of an hour each and another of half an hour. But there is an interesting fact to be taken into account here. The swing effect, it is true, is lost every time we give up a lesson and resume it again after an interval. But the practice effect is carried over from

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## *Making the Most of One's Mind*

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one lesson to another. Experiments have been made to determine how long the practice effect lasts, and it has been found that the practice effect of a single hour's work was preserved and carried over to the morrow, and was not entirely lost even after a lapse of thirty-eight to forty-seven hours. Since the fatigue effect very rapidly disappears, we have thus a great advantage, and it is this advantage that makes progress possible. Naturally the smaller the interval between the lessons the more perfectly is the practice effect carried forward. Accordingly it is wiser to distribute our time over as many different study-periods as can be conveniently arranged, so long as they are not too short to secure the full benefit of both the swing effect and the practice effect.

The actual length of the study-period to be devoted to each subject will depend upon the nature of the subject and the nature and stage of advancement of the student. In schools we have to arrange matters to suit groups, and all we can do is to get some sort of average and do the best we can with that. With the advanced classes the ordinary periods are 40 min., 45 min. and 50 min. With younger classes the period is usually much smaller. In order to get some sort of general rule that will suit all cases it has been suggested that the following sliding scale might be adopted with advantage:

Multiply the number of years in the pupil's age by "two, and the result will give you the number of

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## *A Guide for All Students*

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minutes that forms the suitable lesson-period for that pupil."

In your own case you will probably find that forty minutes forms a very suitable average period of study for a subject. A few subjects may be satisfied with thirty minutes, and some will demand a whole hour. But if you are not trammelled by school or college conditions, you may quite wisely exercise a fair amount of freedom in your arrangements. You may, for example, adopt what is called the intensive method and concentrate on your subjects one after the other. Thus mathematics in its different branches might monopolize a whole evening three times a week for a month, the other subjects having to content themselves with short commons till their turn came for intensive treatment. Some students find this method works extremely well, but it should always be used with the safeguard that you take a wide sweep in your plan of campaign and secure that there is a real periodicity in the intensive study. That is, you would take the year as the unit, so that each subject would have a chance of getting its turn say three or four times a year. If a shorter period is taken, you will find yourself inclined to stop the system just when a disagreeable subject is going to have its innings. Further, this intensive plan should be limited to the major subjects. Certain of the minor subjects should get uniform attention all the way through.

It seems only natural to expect that the various

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## *Making the Most of One's Mind*

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subjects of study should have different fatigue-producing effects. Some demand much harder work than others. In point of fact, experiments have been made, the results of which have led to the following classification, in which 100 is accepted as the maximum power of producing fatigue:

Mathematics .....	100
Latin .....	91
Greek .....	90
Gymnastics .....	90
History .....	85
Geography .....	85
Arithmetic .....	82
French .....	82
German (the mother tongue) .....	82
Nature Study .....	80
Drawing .....	77
Religion .....	77

This table is the outcome of the experiments of a German called Wagner, but the results do not quite agree with those of another experimenter called Kemsies, who puts the subjects in the following order, according to their fatigue-producing power:

1. Gymnastics.
2. Mathematics.
3. Foreign Languages.
4. Religion.
5. German (mother tongue).
6. Nature Study and Geography.
7. History.
8. Singing and Drawing.

We need not be surprised that these two tables do not agree. There are so many things to be taken

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## *A Guide for All Students*

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into account that it is almost impossible to get accurate results. For one thing, the kind of teacher makes all the difference in the world. There are easy-going teachers of mathematics who do not take much out of their pupils, and there are strict teachers of drawing who send their classes away much more fatigued than those from the laxer teachers of harder subjects. For you the most important source of probable error in estimating the fatigue-producing power of subjects is the confusion between two quite different things. We are very apt to think that we are fatigued when we are only bored. *Ennui* or boredom comes upon us when we cannot get up sufficient interest in what we are doing. We may be quite fresh and ready for any amount of work at other things, but not at this particular thing that disgusts us. It is in cases like this that a change of subject is as good as a rest. If we are really fatigued the only remedy is to rest, but if we are merely bored we may obtain relief by turning to something else for a while and then coming back to the tiresome subject.

You must not, however, too readily resort to this change of subject. If you are sure that it is a matter of being bored and not of being really fatigued, you must be very careful not to yield too easily to the desire for change. To give up as soon as you are a little bored is contemptible. You must face the uninteresting in order to attain to something else that *is* interesting. The encouraging thing is that if we

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## *Making the Most of One's Mind*

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do apply ourselves to what has no attraction for us we gradually acquire a sort of pleasure in the work. If this were not so, it would be necessary to give up certain kinds of work altogether, since the mind finds it impossible to attend by mere force of will to any subject in which no interest whatever can be aroused. To the earnest student, however, there are no such subjects. There is always a way of connecting the dry subject, somehow or other, with matter that really does interest us. No doubt it would be a mistake to confine yourself for long periods to these specially uninteresting subjects, and your purpose will be served if you give them their fair share of attention and do not surrender at the first appearance of boredom.

A somewhat similar problem arises in connexion with genuine fatigue. It may be asked: Is it possible to do effective work when we are fatigued? It appears that it is possible. Suppose that the student works on till his usual time for going to bed. He is worn out and quite ready to fall asleep. But for some reason or other it is imperative that a certain piece of work should be done that night. The student goes doggedly on, determined to finish his work in spite of his weariness. By and by a curious thing happens. The drowsiness passes away, the mind becomes clear again, and indeed appears to be clearer than usual. This renewed vigour is sometimes called "mental second wind," and investigations have been made to find out whether the work



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## *A Guide for All Students*

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done under its influence is really good, whether, in fact, it stands the test of "next morning." The conclusion reached by those who have looked into the matter is that in most cases the work done under these unusual conditions is quite good. But the report is not so favourable when we come to consider the effect upon the mind of the student. His work may not suffer, but he does. The essay he produces may be an excellent essay, but it has cost more than usual. This mental second wind is an unwholesome thing. It appears that drowsiness and the other symptoms of fatigue are nature's warning that rest is needed. If the warning is neglected nature removes the symptoms and allows the work to go on, but at the price that she always demands from people who work under pathological conditions. Investigation seems to show that when we are what we usually call fatigued, we are not exhausted. We have reserves of energy upon which we can draw. This is a beneficent arrangement of nature to meet the emergencies of life, and occasions sometimes arise on which it is justifiable to call out our reserves to meet special needs. But the student must realize that it is a dangerous business using emergency means in ordinary circumstances. So it is well to avoid falling back upon our mental second wind unless there is some genuine need for it.

So far it has been taken for granted that the student is connected with some school or college, and that accordingly his work as a whole has been

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## *Making the Most of One's Mind*

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planned out by some one else. But it may quite well happen that you who are reading this are what is called a private student. You may be conducting your studies entirely on your own responsibility, and therefore in need of some little guidance on the planning out of your work as a whole. Now in approaching a new subject there are two main ways of arranging your work. One may be called the Method of Complete Detail, the other the Rapid Impression Method. The first proceeds on the good old-fashioned way of dealing in full detail with everything as it comes, and mastering each part of the subject in its due order and in all its parts. In the second the student takes a scamper over the whole ground as rapidly as possible, in order to get a general idea of what it is all about, and then by and by goes over the same ground in greater and greater detail. Each method has its advantages and its dangers. The Method of Complete Detail commends itself to those who are greatly attracted by the ordinary ideal of thoroughness. It seems the natural thing to begin at the beginning and go right on. But it is not always a very intelligent way of approaching a subject. The student sometimes is put into such a position that he cannot see the wood for the trees. His attention is so much occupied with details that he is unable to form any general idea of what it is all about. It is sometimes months after he has begun a study that a glimmering of what it all means dawns upon him. On the other hand, the Rapid

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## *A Guide for All Students*

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Impression Method is very attractive to the quick-witted, keen, easily interested student, who gallops with great joy through the whole subject, gathering interest as he goes. When it is necessary, however, to begin to go over the matter again in greater detail this type of student is apt to flag.

You will see that in a general way the detailed method attracts those of hard wits, while the quick-witted probably prefer the Rapid Impression Method. You must accordingly consider to which of the two classes you belong and face the problem with a knowledge of your bias. You will doubtless have no difficulty in making up your mind which way your inclinations turn; but you must decide for yourself which of the two methods is most likely to be advantageous to you, being the person you are and in the circumstances in which you find yourself. You will almost certainly feel that there is a rather close balancing of advantages and disadvantages between the two methods, and you will be inclined to make some sort of compromise method of your own so as to combine the advantages of both; and in this you will be wise. For what such a compromise means is that you have made a special application of certain general principles in such a way as to meet circumstances as they exist here and now.

To begin with, if this is the first occasion on which you seek to make an application of your knowledge of how you stand in relation to the two kinds of wit, you will probably find that you are not quite sure

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## *Making the Most of One's Mind*

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whether your wit is hard or quick. In some subjects you seem to belong to the quick wits and in others to the hard. You will be wise then, in taking the nature of the subject into account in classifying your powers, and you cannot go far wrong in making your compromise between the two methods depend upon the nature of your own temperament. If you feel yourself to be too quick-witted, too motor, too ready to jump to conclusions, too easily bored with detail, you will be well advised to give your studies a bias towards the Complete Detail Method. If, on the other hand, you were inclined at school to depend entirely on the directions of your teachers, to take each day's work for granted, to regard everything, in fact, as "all in the day's work," then a bias towards the other method will be to your advantage. The ordinary workaday student, the person who takes no responsibility for the results of his work, the sort of student, in short, who is not in the least likely to read a book like the present, is the person who stands most in need of the Rapid Impression Method. But after all, were it not for the danger of appearing to under-estimate the value of thoroughness, it would be safe to ask *all* students to give their work a bias towards Rapid Impressionism. The really earnest student may be trusted not to misunderstand or misuse the more attractive method, but he must be warned to lose no opportunity of stiffening his will-power by applying himself to the less attractive details.

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## CHAPTER III

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### MANIPULATION OF THE MEMORY

NO apology is necessary for giving to memory a chapter all to itself. It is recognized as one of the fundamental qualities of human nature and the basis of our self-identity. Without memory our individual existence would lose all meaning. We know that we are the same persons that we were last year, because we remember the experience we then had. Memory bridges over the gulf of time and convinces us of the continuity of our own personality.

But while this is true for people in general, for the student the memory has a rather special significance. It has to do with the retention of knowledge, which is the student's special business. We can all acquire, at any given time, a mastery over certain facts, but if we are unable to retain that mastery our labour in acquiring it is wasted. Students are only too willing to admit the weakness of their memory and to lay to that score a great many of their failures. Now it has to be admitted that much depends upon

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## *Making the Most of One's Mind*

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the quality of the memory with which each student starts. A memory that retains well and reproduces easily is certainly a great advantage to a student. It is idle to say that "mere memory" is in itself something rather contemptible. There is a popular impression that intellect and memory do not, as a rule, go together, that the man who has really good brain power is usually indifferently gifted in the matter of mere memory. But experience does not bear this out. There are people, to be sure, who have great power of memory and little power of thinking. These, by depending entirely upon their memory, sometimes bring the memory into disrepute. But, on the other hand, people of great intellectual power who have also excellent memories are those who rise to the highest levels. Both qualities are needed to make a really efficient student. It is sometimes said that a man may have too good a memory. When he wishes to recall something that he wants, his memory shoots out before him all manner of things that he does not want along with the one thing that he does want, so that he is confused with the richness of the store. But this does not imply that the man's memory is too good, but only that it is not properly managed. The natural quality of the memory is one thing, the management of the memory is another.

Of the two, the management is in the hands of the student. The natural quality he must take as something given, something that cannot be changed. You are probably surprised to hear this, as you have

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## *A Guide for All Students*

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no doubt heard and read a great deal about the improvement of the memory. Psychologists are not yet quite agreed about the matter, but you will find that the balance of opinion is entirely against the possibility of improving the original, or what may be called the "brute," memory. We are born into the world with a memory of a certain degree of retentiveness and power of recall. And with that memory we must go through the world, making the best use of it that we can. We may use it wisely or foolishly—and for this we are responsible—but we have only that one memory to use, we cannot improve its intrinsic quality. It is true that we can do something even on the physical side to keep the memory at its best. Wholesome living has a great deal to do with the working of the memory. Overwork, overfeeding, overdrinking, indulgence of every kind, all have a marked effect on the brute memory. Even young people notice how badly the memory works when they are fatigued, and experience proves that certain diseases resulting from excess show their beginnings by a gradual weakening of the brute memory. The one way that you can get at this brute memory so as to keep it at its best is by sensible and cleanly living.

But though we cannot improve the brute memory, we may greatly increase its effectiveness by manipulating it properly. To do this it is necessary to examine what sort of memory we have got, and to discover how we may best use it. In order that we

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## *Making the Most of One's Mind*

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may remember something, we must impress it upon our minds with a certain degree of force. Some minds require a good deal of force, others require very little. The less initial force required the better the memory is said to be. Suppose you and a friend test yourselves by trying how often each of you must read over a little poem before you are able to reproduce it perfectly by memory. It may be that by reading it over say four times you have mastered it, while your friend has to read it over twelve times before he succeeds. In that case your memories stand to one another in the ratio of four to twelve: this means that your friend requires three times as much initial force as you do in order to master the poem. Your memory, in fact, may be said to be three times as good as his. If you like to put it in that way, his index of memory is *one* while your index is *three*. Teachers are now beginning to look into this matter, and in the future they will probably all arrange for giving an index for every pupil in a class. The boy with the poorest memory will have the index *one*, the boy with the best memory the index *ten*, and all the rest will be arranged somewhere between, so that every pupil in the class will know his actual rank with regard to memory—or at anyrate the teacher will, for he may not consider it wise to share his knowledge with the pupils, especially at early stages. In the higher classes, no doubt, it is well that the pupils should know their own indexes.



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## *A Guide for All Students*

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But your investigation of your own memory is not yet complete. You must not forget that though it has cost your friend three times as much effort as you, the result in his case is the same as in yours. You have both mastered the poem. You have both the same possession, though you have bought it at different rates. To this extent you have a distinct advantage as a student over your friend. But there is another test to be made. Next morning, let both of you try to repeat the poem and note how many mistakes each of you makes. Do the same thing three days later, then a week later, then a month later, then three months later. It may come out that though you learnt the poem three times more easily than your friend, he may remember it accurately twice as long. You will, of course, see that we cannot have very exact results in a case like this. When we say that you forget twice as much as your friend we must be understood to speak in a rather general way. What we are doing is to establish a rough and ready index of forgetfulness or obliviscence. In this case your index of obliviscence would be *two* to your friend's *one*. So that in estimating the index of really efficient memory you would not rank very much above your friend, for your greater ease of learning would be balanced by his power of retaining longer an accurate knowledge of what he had learned. All these things will be kept in view by the teacher in the future when he is estimating the powers of his pupils, and he may either have

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## *Making the Most of One's Mind*

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two indexes for each pupil, an index of quickness of learning and an index of obliviscence, or he may amalgamate the two and find a composite index of memory "efficiency."

But suppose now that you surpass your friend in both ease of acquiring and power of retaining accurately, you have that permanent advantage over him as a student. Suppose, further, that you and he do exactly the same kind of work and put out exactly the same amount of energy in the same way for ten years, then at the end of that period you will almost certainly stand in the same relative position to one another, so far as the natural power of memory is concerned. You will still retain your initial advantage: your index of memory will remain the same in relation to his. No doubt you will have acquired more knowledge than he during the ten years, but that is beside the present point.

If, however, during these ten years you rely upon your superior natural gifts, while your friend, realizing his disadvantage, puts extra energy into his work and uses his poorer memory energetically and skilfully, and seeks out the best ways of manipulating it, the result at the end of the ten years may well be that he can use his memory so as to produce results as easily and as quickly as you. But this does not mean that his brute memory has been improved, but only that he has learnt to use it in a more skilful way, and in particular to apply it more effectively in connexion with certain definite kinds of facts.

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## *A Guide for All Students*

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This last point is of special importance, for experience shows that improvement in the memory is always improvement in a certain direction, that is, in connexion with a particular kind of matter. Indeed, it is sometimes said that we have all excellent memories for something or other. Schoolmasters are well aware that the boy who cannot anchor the battle of Marathon to any fixed date, has no difficulty in reeling off an interminable list of "football fixtures" for the coming season. The girl who can never be sure whether Bombay is on the east or on the west coast of India, will remember in the minutest detail the position of a ribbon on a hat that she saw weeks ago in a shop window. This does not mean that we have different kinds of memories—a football memory and a history memory, a millinery memory and a geography memory—but merely that we remember different kinds of things with different degrees of ease and accuracy. The natural interest of a boy in football is replaced in the future by the acquired interest in the affairs of his business or his profession. He can, in adult life, remember business matters even though his memory for other things is very bad. Sometimes, indeed, he can remember business things only in connexion with business. A psychologist gives a case, for example, in which a ticket-clerk could remember all about fares and distances and connexions while he was in his little office, but the moment he left it he could give no reliable information even about his

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## *Making the Most of One's Mind*

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own line. Memory improvement nearly always means improvement in dealing with a particular class of facts.

The minimum initial force necessary to impress something on the mind so as to secure its retention may be applied all at one time, or it may be applied at different times by instalments. Suppose we had a standard unit of force, say one second of the most intense attention of which we are capable, and that ten of these units were necessary to commit a particular fact to memory. Then we might either give the ten seconds consecutively, or in separate instalments. Thus we might give ten separate seconds with an interval between each, or five periods of two seconds with an interval between each period. The intervals may be long or short, so that quite a number of considerations claim attention. The important question is, which is the better way of learning, the condensed application or the instalment system? Often we have no choice. Certain matters must be committed to the memory at once, or our chance is for ever gone. But, on the other hand, there are occasions when we do have the choice between the two methods, and our general principle should be that in cases of small portions of subject-matter the condensed form is the better, whereas when we have to face a longish bit of work the instalment system is more profitable. What we considered already in connexion with the distribution of your time among your various subjects applies here. You have all

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## *A Guide for All Students*

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the advantage of unconscious cerebration between the different instalments. It is true that we have here certain considerations that do not apply to the same degree in the process of learning as opposed to remembering. We have to realize that the rate at which we forget has to be taken into account. If we have a high "index of obliviscence" then it may be less advisable for us to adopt the instalment system. We may lose so much between the instalments as to cause an unprofitable amount of relearning. If your obliviscence index is small, you are safe to adopt the instalment system. If it is large, you have to choose between avoiding the instalment system altogether, and adopting it with the modification that there must be the smallest practicable interval between each instalment. The latter alternative must be adopted in all cases where, from the nature of the case, the concentrated method cannot be applied. Such cases are continually occurring, since many things have to be committed to memory that are so complicated that they cannot be all mastered at one sitting.

The use of the phrase "committing to memory" is apt to be confusing, as it has at least the suggestion of that kind of memory work known as learning by rote. This means getting into the memory a form of words without paying any attention to the meaning. Sometimes a distinction is drawn between learning *by heart* and learning *by rote*. As a rule the terms are used interchangeably, but, if they must be distinguished, learning by heart may be said to

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## *Making the Most of One's Mind*

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be learning a subject in such a way that it becomes a part of our very self. We deal with the matter so thoroughly that we actually assimilate it. Rote-learning, on the other hand, may be limited to the mere parrot-like repetition of a form of words, so as to commit them to the brute memory without any thought of their meaning. For example, in learning the multiplication table, a child may sing the tables up and down so as to be able to repeat them either upwards or downwards, and yet be unable to use the tables unless by repeating each table till the appropriate number is reached. This would be learning by rote. On the other hand, the pupil may be so practised by the teacher in giving at once various products, such as four times eight, nine times seven, eleven times twelve, that he is able at a moment's notice to give any product in the table. In this case he may be said to know the table by heart. If there be any distinction, the advantage in such matters clearly lies with learning by heart. But it is usual to use the terms interchangeably.

In former times so much was done in schools by means of mere rote work that it is not wonderful that there is at present a great feeling against it. One of the earliest protests is to be found in Montaigne, who tells us that "To know by heart is not to know." As you will see, this statement is ambiguous. The two possible meanings are: (*a*) The fact that you know a thing by heart does not necessarily imply that you really know it. (*b*) The very

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## *A Guide for All Students*

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fact that you know a thing by heart shows that you do not know it. The first meaning is certainly the only justifiable one. It is nonsense to maintain because we know, say, a poem by heart that therefore we do not understand it. In fact, there is a definite place for learning by heart. A person who learns by heart a proposition in geometry is not only wasting his time but is injuring his chances of doing genuine thinking. The pupil's own form of stating the proposition is preferable to that of anyone else, since it secures the activity of the pupil's mind. But in the case of anything in which the form is of the very essence of the business in hand, then learning by rote is both justifiable and desirable. A great part of the charm of a poem is the beauty of the actual expression. There is nothing more irritating than to hear some one praising a poem and giving scrappy, inaccurate renderings of a beautiful passage, interspersed with crude prose paraphrases to fill up what the speaker cannot remember in the poet's words. A poem should be either quoted verbatim or merely described. Even "rules" are sometimes worthy to be learnt by heart. But here we must be very careful. It is always wrong to begin by learning a rule and then go about applying it. But in the course of your studies you will be set frequently by your teacher to work out certain problems, and as you work them you will gradually see the underlying principle on which you proceed. By and by your teacher will invite you to set out the principle.

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## *Making the Most of One's Mind*

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This is really an invitation for you to formulate a rule. Your formulation may be excellent, but frequently it will be found to be faulty, and the teacher will present you with a carefully thought-out and precisely expressed rule. This it is often desirable to memorize, since it expresses in the clearest and most exact way a truth that you have thoroughly grasped. It is profitable, then, to memorize rules for which you have honestly worked.

Since there are occasions on which it is desirable to learn things by heart, it is worth while considering the best way of setting about the business. To begin with, we must give up the notion that we are to work in the unintelligent way that the definition of rote-work implies. So far from it being desirable that we should not think of the subject-matter, we ought to keep prominently before us the meaning of what we are learning. If we are dealing with a mere rule, or a mere bit of grammatical accident, there is no difficulty. It is only a matter of concentration of attention. But when we approach a work of greater length a very definite problem arises, the problem of the unit of memorizing. In learning a poem, for example, of the length of Milton's *L'Allegro* or Gray's *Elegy*, almost no one could master it at a sitting. The work has accordingly to be divided up into sections, and the problem arises of the principle on which the division should be made. The length of each section can be determined only in view of the time at your disposal on each



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## *A Guide for All Students*

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occasion and on your own index of memory. But the division should certainly be made according to the nature of the subject-matter, and not merely by the number of lines. In other words, certain portions of a poem are more easily memorized than others, and it is therefore unwise to divide a poem up merely into passages of a certain number of lines each. We learn by following the thread of the poet's thought rather than by following the mechanical division of lines and stanzas.

Having selected a unit, say six stanzas, for a particular period, the next principle to be observed is that the unit should be learnt as a whole. This seems a very remarkable bit of advice. For we are so accustomed to learn a poem stanza by stanza that there seems something altogether wrong in attempting to learn six stanzas at once. Yet actual experience shows that it is more profitable to read over the whole six stanzas consecutively and then re-read them over and over again as a whole. It appears that the gain comes in from the carrying over of the stream of intelligence from one stanza to the next. When we learn by separate stanzas, each is inclined to stand out as a unit by itself, and there is a difficulty at the end of each in getting switched on to the proper one to follow. The advantage in time-saving of this block-system of learning by heart arises from the fact that it makes the subject-matter of first importance in the learning. The words take their proper place as the expression

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## *Making the Most of One's Mind*

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of consecutive thought. This makes it specially important that we should understand perfectly the meaning of what we set about committing to memory. Any mistake that we commit to memory involves a great amount of wasted time before it can be re-learnt correctly.

Do your memorizing as quickly and intensely as possible. Divide up your time available for this purpose into sections of severe concentration, separated by short pauses, during which you allow the mind to lie fallow. After committing something to memory try, if possible, not to begin at once on a new piece of work. It is profitable to allow the matter a little time to sink in.

You will, of course, distinguish between the kind of memory we are here dealing with, verbal memory, and the other kind that, you remember, we named rational memory. In the first kind we retain and recall the very words used in certain connexions. This may be done with or without understanding their meaning, though we have seen that such an understanding is an advantage. In the case of the rational memory we recall facts in their true relations to one another, though we may be unable to express them exactly as we may have heard them expressed. This is the kind of memory that enables one to give "the substance of" a passage that one has read. Of the two, the rational memory is the more important, but each has its place. A person may be very weak in verbal memory and quite strong

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## *A Guide for All Students*

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in rational memory. The two powers have no fixed ratio to one another. It used to be thought that by cultivating the verbal memory the rational memory could be strengthened. It was a very common belief, for example, that by learning poetry by heart, the memory in general could be improved. This view is now abandoned, and it is recognized that memory-training must consist in training the memory in the particular way in which improvement is desired. Practice in learning by rote only increases our skill in rote-learning.

When we say that the brute memory cannot be improved, we have seen that we seem to go against the experience of people in general, for we are all familiar with certain systems of memory-training that profess to increase the natural capacity of remembering. But all these systems depend for their success on a skilful manipulation of the natural memory the pupil brings to the system-maker. They all start by causing the pupil to acquire in the ordinary way, that is by application and repetition, some definite basework, and then arrange in some definite relation to this basework all matters to be remembered. Many of them are very ingenious, but they all demand a certain amount of initial effort, and a further effort in applying the ingeniously systematized rules. They all depend on getting the pupil to apply the ordinary modes of remembering, though these are aided by the scheme of the systematizer. One of the oldest schemes, for example, is

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## *Making the Most of One's Mind*

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to make the pupil imagine he has a house of a certain number of rooms, each room being set apart for one special set of facts—one room for agriculture, another for war, another for law, another for literature, and so on. Each fact the pupil wishes to retain is taken by him in imagination to the proper room and there deposited in a suitable place in relation to the other facts already placed there. This continual wandering about the imaginary house familiarizes the pupil with the contents of each room, and thus by repetition and revision enables him to master the essential details. The system-makers claim to establish a *memoria technica*, an artificial memory. But we can no more have an artificial memory than we can have an artificial soul.

What gives success to the memory-improvers is the fact that they do insist upon their pupils concentrating upon certain points. The mere fact that the pupil must repeatedly go over the facts to be retained ensures that he shall make that expenditure of energy upon each that is essential to its complete retention. Further, people who go to trainers of the memory want to learn: in almost every case they want to learn some particular kind of fact, and all the exercises they get naturally are made to bear upon facts of this class. Accordingly progress is made. You may rest assured that there is no memory improver like the honest and earnest concentration of attention on the facts that you wish to master.

Yet an intelligible arrangement of facts does help

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## *A Guide for All Students*

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greatly, and what the best of the memory systems do is to enable the pupil to organize the facts that he wishes to retain. The hardest facts to hold are isolated facts. The ideas in the mind have been compared to "living creatures having hands and feet." These living creatures have a tendency to form friendships among themselves and to do the best they can for one another. One of their main acts of friendship is to help their friends into the consciousness where they themselves belong and to do their best to prevent them from being thrust out of it. Accordingly the greater the number of friends a new idea can form among the old ideas, the better its chance of retaining its place in the mind, or of being easily brought back to it. The moment we can fit a new fact into a group of old facts, we have given it a chance of retaining its place in our mind.

Certain more or less artificial ways of grouping new facts with old are recognized and known by the name of *Mnemonics*. Among the tricks of this kind are the well-known rhyming Geographies and Histories that have had their day and have gone to the place prepared for them. It is among the best of these, *Dr. Mackay's Rhyming Geography*, that we find the following:—

"The states of Northern Germany  
Are twenty-two in number,  
The names of which I need not give  
The mem'ry to encumber."

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## *Making the Most of One's Mind*

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Even worse is another stanza from the same book:

"The southern half's a triangle  
Of greater elevation,  
With several lofty peaks that reach  
The line of congelation."

What is wrong with these is the intolerable amount of scaffolding to the very small amount of structure. Further, any pupil who knows about "the line of congelation" does not need the help of a stanza to remember that the Deccan is triangular and has snowy mountains. The help given by such verses is illegitimate, since it tends to throw us back upon mere rote-learning. We depend on words, not upon thoughts. It is true that there are certain facts in our studies that cannot be fully explained at the stage at which the pupil stands, and yet must be remembered. Of this kind are the verbs that govern the dative in Latin; and many of us, in our preparatory-school days, have been grateful to the author of certain flagrant rhymelets.

"A dative put, remember pray,  
After *envy, spare, obey,*  
*Heal, favour, hurt, resist,* to these  
Add, *order, succour and displease. . . . !*"

And so on. Some objection might be raised to this mnemonic since certain fairly intelligible reasons can be assigned why these verbs should govern the dative and not the accusative. But there is another mnemonic of the same kind that seems to meet all the requirements. It is that which keeps in the

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## *A Guide for All Students*

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memory the Latin prepositions that govern the ablative. It runs:

“A, ab, abs, absque, de,  
E, ex, coram, cum, pro, prae,  
palam, sine, tenus.”

Here there is no scaffolding at all. The mnemonic fries in its own juice as it were. It has the attraction of both rhyme and rhythm. Further, it deals with just those matters that cannot be treated in a rational way. There is no doubt some reason why these prepositions should govern the ablative and others should not, but it is not a reason that is open to the pupils at the stage at which a mnemonic is valuable. The same argument might be applied to the mnemonic for keeping in their proper places those troublesome *nones* in the Roman calendar. The following couplet is supposed to remove the difficulty:

“In March, July, October, May,  
The nones fell on the seventh day.”

But when all is said, we are not secure. May is the only month about which we can be quite certain. The rhyme fixes it. But the other months in the first line might easily escape us, and in our effort to make the lines run we might quite well substitute other months. Thus the couplet might readily go:

“In April, June, November, May,  
The nones fell on the fifteenth day.”

The matter of rhythm is too often neglected in

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## *Making the Most of One's Mind*

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the process of memorizing. If it is necessary to keep in mind a group of words that are related to each other, it is advisable to arrange them in such a way that they shall run smoothly into each other. The following illustration serves at once as a warning and as a model. It was part of the work of school pupils to "get up" all the important towns in each of the counties in the British Islands. This should have been done, of course, by making the pupils look out the towns on their maps and make a mental picture of their place in each county and their positions relative to each other. But teachers often adopted the plan of making their pupils merely memorize a list of towns for each county. Thus the four important towns of Argyleshire were learnt by rote as Inverary, Dunoon, Oban, Campbeltown. So far we have had only the warning. For in the first place, the list should not have been committed to memory in this way at all, and in the second, if it had to be committed, it should have been so arranged as to help the mind in retaining it. Note how much more easily it runs as Inverary, Oban, Campbeltown, Dunoon. If you repeat it over two or three times you find a difficulty in stopping. At least, that was what happened to the children who had the words placed in this order. If you have to get up the members of a particular ministry, or a list of minerals, that have no special order of relative importance, it is wise to arrange them so that they make a pleasing combination of sound.



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## *A Guide for All Students*

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We all do this sort of thing in our efforts to master more or less disconnected details. Even the method of using the initial letters of words that have to be grouped together is quite permissible. The student is assumed to have a competent knowledge of the important parts of the subject and to require help only in keeping the proper elements together, and in recalling them in their proper place. No student of English History has any difficulty in stating who the members of the famous *Cabal* were. He reads them off by their initials, Clifford, Arlington, Buckingham, Ashley and Lauderdale. I quote this example because it is interesting and respectable. You will be well advised to avoid all such childish phrases as those used to keep in their order the battles of the Wars of the Roses. An occasional manipulation of the initials of things we want to group is quite permissible, but any elaboration of the plan is a waste of time, with the added danger of emphasizing unimportant elements and relations.

There is one particular problem for the memory that gives rise to a great deal of difficulty. This is the fixing of the alternative. It is quite common for the student to remember that a fact is true in one of two forms, but not to be sure which is which. The point is illustrated in the venerable story of the drill sergeant who asked the recruit his height, and was told that it was "either ten foot five or five foot ten." In a case of this kind there is a standard ready at hand to determine which alterna-

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## *Making the Most of One's Mind*

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tive should have the preference. But it is not usually so, and the student is often tormented with doubts, and has sometimes to fall back upon mere guess-work, to throw up the penny and let fate decide. Most of us try individual little tricks to keep us right when we see the chance of our being put in a dilemma by a future demand for a decision. Here are some examples.

In French there are two verbs that have an awkward trick of getting into each other's way. *Pêcher* means to fish, and *pêcher* means to sin. The student has no difficulty in remembering that the one has an acute accent and the other a circumflex, but the trouble is to remember which gets which. An ingenious teacher got his pupils out of this hesitation by saying that a sinner usually thinks he is a rather 'cute person. Sinners aren't really acute, the teacher explained in the interests of morality, but they think they are, so "you will always remember that sinning gets the acute accent." To make matters doubly sure, this teacher pointed out that the circumflex accent was not very like a fish-hook, but it was at anyrate more like a fish-hook than was the acute accent. With these two lines of guidance this teacher's pupils never after had any trouble with these verbs.

It is not difficult to make pupils understand that in the northern hemisphere whirlwinds rotate from east to west, or, as it is commonly expressed, "in the opposite direction to the hands of a watch," and

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## *A Guide for All Students*

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that whirlwinds in the southern hemisphere move in the direction west to east, or in the same direction as the hands of a watch. It is found that pupils readily remember the distinction, but they are never sure on which side of the equator the two kinds of movements are to be placed. Here again the ingenious person comes along and explains that if we take the ordinary movement of the hands of the watch to be the standard, we have only to ask ourselves about the whirlwind whether it follows the direction of the hands of a watch and remember the following answer: North, *no*: south, *so*. This, again, worked very well for examination purposes, but the question rises whether such tricks are justifiable in our studies. The answer is best given by considering the state of knowledge of the person who uses the mnemonic. If this knowledge is sufficient to supply a rational explanation, then we should never fall back upon a mere trick to fix the alternative. The practical rule that should guide us in the use of Mnemonics is: Make the mnemonic as *real* as possible, i. e., let the scaffolding be as closely related to the fact to be remembered and as true to reality in itself as is possible. Another way of expressing the same thing is: Never depend on a mnemonic when you can reason out the facts from data supplied.

For example, time in New York is different from time in London, and many people can never remember whether the American clocks are fast or slow compared with the English. An English mnemonic

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## *Making the Most of One's Mind*

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might be that however smart the Americans think themselves, the English are always several hours ahead of them. The Americans might retaliate with the mnemonic that since England is an old and effete country, it is natural that it should be evening in England while it is still noon in America: young nation young time, old nation old time. But this is a case in which no mnemonic is required. Everybody knows that the sun moves from east to west. When it is overhead at London, London has midday, while America must wait till the sun reaches her before it can be midday there. An English watch must therefore be "fast" when compared with an American watch.

Among the most effective ways of fixing the alternative is the force of contrast. In the scale of colours the wave-lengths increase towards the red end of the spectrum and diminish towards the violet. There are reasons for this, which the man of science can give, no doubt, but for the student at an examination in elementary physics it is comforting to remember that red is the smallest name for a colour and yet has the biggest wave-length. Violet has a big name and yet has to be content with the smallest wave-length. This mnemonic is typical of the sort of thing that is most useful to you in your ordinary work. It is simple, natural, free from scaffolding and all manner of fuss; and these are just the qualities you should insist upon having in the mnemonics you use.

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## CHAPTER IV

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### NATURE OF STUDY AND THINKING

WHEN we study we apply our minds to what is going on around us, in order that we may learn how to behave ourselves intelligently in relation to those surroundings. We are not to suppose that study is confined to books. It is true that most people associate the notion of study with schools and colleges, or at the very least with books. But in the broad sense study consists in deliberately acquiring such familiarity with our surroundings as shall enable us to make ourselves thoroughly at home in them. To be sure, conning the multiplication table and learning to read seem remote from the needs of the very complicated adult life that lies before the pupil, but the accomplishments of the schoolroom have all a very definite relation to the pupil's present and future surroundings. Study has for its aim the mastery of the conditions under which we have to live. The student may be misdirected in his study, but the mastery of his surroundings is always

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## *Making the Most of One's Mind*

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his ultimate aim. Indeed, education has been defined as the process by which the educand absorbs and is absorbed by his environment. As we learn we may be said to take possession of the outer world and make it a part of our mental life, while at the same time the outer world is taking possession of us and making us conform to all its conditions; the result being that we gradually find ourselves more and more at home in our surroundings.

Froebel, in speaking of education, tells us that the pupil's activity works in two ways. At one time it is busy taking in material from the outer world: this he calls making the outer inner. At another time it is occupied in impressing its own influence upon things without: this he calls making the inner outer. In the first case the outer world is supplying material for the mind to work upon; in the second the mind, by its reaction on this material, is, at least to some extent, modifying the outer world. Sometimes the first process is called impression and the second expression. To the process of learning, both are necessary.

Herbert Spencer expresses the same truth somewhat differently when he says that "knowledge is turned into faculty as soon as it is taken in, and forthwith aids in the general function of thinking . . . does not lie merely written on the pages of an internal library, as when rote-learnt." In plain English, Spencer regards it as possible to turn fact into faculty. At first sight this seems a hard saying.

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## *A Guide for All Students*

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How can an external fact, say the law of gravitation, become a part of the faculty of a human being? But when you come to think of it, you will realize that you are a different sort of person from what you would be did you not know the law of gravitation. Everybody knows the effects of the law of gravitation, whether they know the law itself or not. The most illiterate man would be a different sort of person if he did not know that when the support of his hand is removed from the jug he is carrying, it will fall to the ground. And in the same way you would be a slightly different person from what you are if you did not know that gravitation exercises its power "inversely as the squares of the distance." If, as a matter of fact, you do not at this moment happen to know the exact law of gravitation, then you will become a slightly different person when you do know it.

When you look into the matter, you will readily see that knowledge is sometimes treated as passive and sometimes as active; or, if you prefer it, knowledge is sometimes static and sometimes dynamic. People often speak of "mental content," by which they mean all the knowledge belonging to a particular mind. Your mental content is made up of all the ideas that are either in your mind now, or have been there before and may be called up again by and by. Investigations have been made, for example, into the contents of the minds of school children. The mental content of a country child is found to be different

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## *Making the Most of One's Mind*

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from that of a town child, and in comparing the two, the investigator makes a sort of inventory in each case and then compares the results. From this point of view we are clearly dealing with knowledge as static. Ideas are regarded as in a way the furniture of the mind, and just as we may make an inventory of tables and chairs and sideboards, so we may make an inventory of ideas of larks, and tram-cars, and hayricks, and asphalt pavements. When we make the outer inner, we are increasing our mental content.

But ideas do not remain sedately where we put them, as chairs and tables do in a room. They are in continual movement, and would almost appear to have a life of their own. You will remember that ideas have been said to be "living creatures having hands and feet." This you will understand is nothing more than a figure of speech. Ideas do not have any power of their own apart from us. It is we who give them whatever force they have. But all the same, ideas will not do exactly what we would like them to do, for they are influenced by what goes on in the outer world. Ideas are related to one another in our mind in a particular way because the things outside that correspond to the ideas are related to one another in that same particular way. The idea of blue and the idea of tomato refuse to be joined together. It is true that we can, by the use of our imagination, make ideas behave in a way that does not correspond to what goes on in the outer world.



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## *A Guide for All Students*

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But we know all the time that if we are to make ourselves at home in our surroundings we must respect what takes place in the world of things. We must recognize facts. When we take in a fact and turn it into faculty, what has happened is that we have realized how certain elements in the outer world act in relation to one another, and that we have made up our minds to act accordingly. If we have a true idea of a dog, this means that we know how to behave intelligently when we meet dogs, or when people speak to us about dogs. The idea of dog is active to that extent. It is not a mere picture inside our mind: it is really our way of dealing with dogs. All the facts that we know about dogs have been turned into the faculty of behaving intelligently wherever dogs are concerned.

It is worth noting that not all facts become faculty to the same degree. Many facts have so little bearing upon our life that they hardly seem to have any effect at all. You could sit down with a sheet of foolscap and in a few minutes fill it with facts about the room in which you are sitting, that are of no consequence to anyone, even to yourself. The facts that count are what may be called significant facts, facts that have a meaning, facts that are so related to other facts as to be capable of giving practical guidance in our thinking, acting or feeling. Now in our studies we are supposed to deal only with significant facts, facts that can and ought to be turned into faculty. No better test, indeed, could be applied to

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## *Making the Most of One's Mind*

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discover whether certain subjects should be included in the school curriculum than the question: "Can and should the facts included under these subjects be turned into faculty?" The multiplication table, for example, certainly supplies facts that ought to be turned into faculty. We are different sorts of persons because we know these facts. It would be a different sort of world if seven times eight were sometimes fifty-six and sometimes sixty-four.

These considerations give us some help when we come to our actual study. We find that, broadly speaking, our work is of two kinds. Sometimes our main business seems to be to acquire knowledge: certain matters are placed before us in books or by our teachers, and we are required to master them, to make them part of our stock of knowledge. At other times we are called upon to use the knowledge we already possess in order to attain some end that is set before us. In a general way, the two may be classed as acquisitive and constructive work. In Geography, for example, so long as we are merely learning the bare facts of the subject, the size and contours of the different continents, the political divisions, the natural features, we are at the acquisitive stage. We are making the outer inner. But when we go on to try to find out the reasons why certain facts that we have learnt should be as they are and not otherwise, we pass to the constructive stage. We are working constructively when we seek to discover why it is that great cities are so often

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## *A Guide for All Students*

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found on the banks of rivers, why peninsulas more frequently turn southward than northward, why the jute industry settled down in Dundee. You will readily realize that all this manipulation of knowledge and its application to new cases marks out what are called "problems" as the special sphere of constructive study. In acquisition we depend largely upon the memory, in constructive work we depend more upon the reason.

In our study we must not lose sight of the effect that our mental content produces upon the new matter that is presented to it. We learn with our minds, no doubt, but we also learn by means of the knowledge we have already acquired. We receive and understand new facts in different ways according to our mental content. A big word is sometimes used to represent this action of the mind as modified by its acquired knowledge. This word is *apperception*, and indicates the process by which our present knowledge acts upon any new fact that is presented to the mind. Some writers object to this word as being unnecessarily technical. They say that there is another word at present in use that will serve our purpose extremely well. They say that just as the mind takes in and acts upon knowledge, so the body takes in and acts upon food. *Assimilation* is the name given to the process by which the body takes in food, acts upon it, and makes some of it part of itself. Accordingly we need have no difficulty in accepting *assimilation* as a better word than *acqui-*

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## *Making the Most of One's Mind*

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*tion* to represent the process by which the mind takes in facts and transforms at least some of them into faculty. The new term emphasizes the point that the two processes, assimilation and construction, are not so widely opposed as the term *acquisition* would suggest. For purposes of exposition I began by using the term *acquisition*, because I wanted to make the contrast a sharp one, but now that we understand the two kinds of study better, we can fall back upon the more accurate term *assimilation*.

For a very little reflection will make you see that while there is a distinct difference between the two kinds of study-work, they must not be regarded as entirely separate from or independent of each other: they are not mutually exclusive; they necessarily interpenetrate. Assimilation does not consist entirely in gathering in new facts, nor does construction confine itself to the manipulation and application of facts already acquired. The two processes to some extent overlap. In acquiring new facts we must always use a little reason; while in constructive work we cannot always rely upon having all the necessary matter ready to hand: we have frequently to stop our constructive work for a little in order to acquire some new facts that we find to be necessary. Thus we acquire a certain number of new facts while we are reasoning about things; and while we are engaged in acquiring new matter we must use our reason at least to some small extent.

Students differ in the way they regard the two

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## *A Guide for All Students*

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forms of study. Assimilative work is generally regarded as easier than constructive. The more commonplace student rather likes to sit down deliberately to master a certain amount of detail, to lay in a good store of definite information. He knows where he is with this sort of work. It does not exhaust him: he is not worried with that call for initiative that marks work of the constructive kind. On the other hand, many capable students find it almost intolerable to sit down and steadily amass material. They want rather to keep on applying material that they have already at their disposal. Now with such students it may be possible to arrange that they shall do most of their assimilation in the process of working out problems. Instead of sitting down systematically to acquire certain bits of knowledge which may then be applied to problems, they may begin with the problems and then acquire, as they need them, the necessary facts. In this case they would always have the stimulus of a definite purpose in acquiring any necessary piece of information. The danger of getting information in this way is that there is almost certain to be various gaps left in the pupil's knowledge. The purely assimilative student ordinarily studies his subjects in a very systematic way, and thus secures that his facts are logically arranged and that there are no gaps. It is highly desirable, therefore, that those who prefer to acquire their knowledge in the active process of doing constructive work, should

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## *Making the Most of One's Mind*

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arrange for a short supplementary course extending over the ground covered by that constructive work, so that the inevitable gaps may be decently filled.

Though of the two forms of study-work the assimilative is sometimes spoken of as being less important than the other; we must not forget that both are essential for a real mastery of any subject. We shall see later that for examination work too great importance is attached to the merely assimilative side, though even in examinations there is now a tendency to change matters so as to give greater prominence to the constructive side. But apart from examination requirements, there is need for the somewhat more systematic study involved in the ordinary assimilative process. If we do nothing but use material already acquired, and add new material only incidentally, we run the danger of getting a one-sided view of certain subjects, and of missing some facts that, though not likely to be disclosed in the constructive process, yet would be of great value in giving a fresh direction to that process. In any case, the man who desires to have a really all-round acquaintance with a subject must be prepared to devote a certain amount of time to the direct acquisition of facts as facts.

Some subjects lend themselves specially to the constructive form of study. These are they in which from certain known facts it is possible to infer a great many more. In such subjects we are continually making assumptions with regard to the matter

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## *A Guide for All Students*

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in hand, and proceeding to verify or correct these assumptions. This is really a process of guessing, carried on under legitimate conditions. As a rule, schoolmasters and professors have a deadly animosity against guessing. It is their custom to complain bitterly about foolish answers as the result of mere guessing. But the introduction of the word *mere* makes an important difference, for it implies that there is a kind of guessing that is not open to obloquy. Indeed, we have to recognize the fact that in their ordinary work students are guessing very nearly all the time. Unless they are dealing with matters that they have learned by the mere process of assimilation, all their answers are reached by a system of guesswork. It is true that this guessing has a sound foundation, and is, in fact, the only way in which real progress can be made. If a question is put in such a way that we are able to remember the exact answer that we know it requires, we can answer with the certainty of being right. But in most of our other answers we have little more than a feeling of probability.

It has to be admitted that in certain lines of reasoning we are able to come to conclusion after conclusion with certainty, even though we have never had occasion to deal with the matters in question on any previous occasion. Such is the state of affairs when we are concerned with what is technically known as reasoning. This consists in the application of certain very vague but universal laws

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## *Making the Most of One's Mind*

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of thinking, usually known as the *Laws of Thought as Thought*. When these laws are written out they appear to be very empty and formal, and indeed to be somewhat silly, or at the best superfluous.

The first of these portentous laws is known as the Law of Identity, which maintains that whatever is, is; or that  $A$  is  $A$ . It is sometimes represented by the formula, that does not seem to get us much further forward,  $A = A$ .

The second is called the Law of Non-Contradiction: it runs—whatever is contradictory is unthinkable. It, too, has a formula:  $A = \text{not} - A = O$ . Or if this does not please you, then you may choose:  $A - A = O$ . To help you to attach some meaning to these perplexing formulæ, you may take as an example the fact that any statement you may make cannot be true and false at the same time, and tested in the same way. We have to put in those two qualifications, since it is possible, for example, for John Smith to be both guilty and not guilty of the murder of Richard Robinson. He may have known that Robinson was about to walk during a fog over a railway bridge that had been broken in the middle during a recent gale. By giving no warning, Smith was *morally* guilty of murdering Robinson. But since, as a matter of fact, Smith had done nothing at all in the matter, he is not *legally* guilty of the murder. In the same way, a watch may be both right and wrong at the same moment: right with the town clock, but wrong by the Greenwich standard.



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## *A Guide for All Students*

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The third law is that of the Excluded Third, or the Excluded Middle. This tells us that of two repugnant notions that cannot both exist together, one or other of them must exist. It has been thus expressed: "Of contradictory attributions we can affirm only one of a thing; and if one be explicitly affirmed, the other is implicitly denied. *A either is or is not. A either is or is not B.*" Either there are mermaids or there are not mermaids. There is no intermediate state. John Smith cannot in the eyes of the law be both guilty and not guilty of the murder of Richard Robinson, but he must be one or the other.

Now I do not expect that you will have the least inclination to question any of these laws. You could not break them even if you tried. What troubles you, no doubt, is that you do not quite see the necessity to state them at all. They seem so empty as to be quite useless. And yet it is because these laws are there and cannot be broken that we can argue with one another and be quite sure that our minds will work uniformly.

But if we must all obey these Laws of Thought as Thought, and if all our minds work uniformly on the same principles, how does it come about that we ever reach different conclusions? Have you ever considered how it is that an honest Radical and an honest Conservative, from an examination of the same facts, come to diametrically opposite conclusions? From what we have said about these laws,

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## *Making the Most of One's Mind*

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we might naturally expect that from the same facts only one conclusion could be drawn, and if it depended merely on the laws, this would be true; but other things have to be taken into consideration. The English philosopher John Locke was of the opinion that two men must come to the same conclusion on any subject if the following conditions were observed: (1) they must know all the circumstances of the case; (2) they must be free from bias; (3) they must give their minds seriously to the subject. Men differ in their opinions because they cannot observe all these conditions, and in fact, when we look into the matter, we find that very few people observe any *one* of them.

It is obviously impossible for any man to hope to know all the circumstances of any case, for this would really imply that he knew all about everything in the universe: since, after all, everything is related to everything else in some way or other, however remote. It would be enough, indeed, if our honest Radical and our honest Conservative knew *exactly the same facts*, but even this is all but impossible, since all the knowledge that each possesses about other things would affect his knowledge about the particular facts that are under discussion on any one occasion.

But the second condition is quite as hard to fulfil. It is almost impossible for a man to empty himself of his preferences and dislikes. He may make the most strenuous efforts to keep a perfectly fair mind, yet he

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## *A Guide for All Students*

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will find that his likes and dislikes do come in and interfere with the soundness of his decision. It has to be remembered that this does not mean that he always favours his own side. The effort to be quite fair may result in the Radical or the Conservative giving an unfair advantage to the view he dislikes. When a fair man gives to an opponent the benefit of the doubt, it almost always means that the opponent is getting the advantage of a bias. Thus in the effort to be fair to all his pupils, a schoolmaster who has a son in his class is apt to be more severe on his son than on the other boys.

It is when we come to the third condition that there is hope, for the honest man can at least give his mind to the subject. Most of the opinions of the ordinary man come to him more or less ready-made. He accepts the opinions of others, or if he strikes out on his own account, he often does so after a merely superficial examination of the facts of the case. As a student, it is your first business to give your mind seriously to all those matters submitted to you on which you are expected to pass an opinion. In the purely assimilative process you may, under certain conditions, regard the material supplied as already guaranteed, but the moment you enter upon constructive work you must be prepared to give your mind to a critical examination of the matters presented to you.

So long as we are working within the realm of the Laws of Thought we can be quite certain of our

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## *Making the Most of One's Mind*

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answers. We have no need to hesitate. There is no room for guesswork. If I am told that, at the age of seventy-two, John Locke died in the same year that the Battle of Blenheim was fought, and that this battle was fought in the year 1704, there is no guesswork whatever in my saying that he was born in the year 1632. Thackeray tells a story about an abbé who called upon a certain count, and while waiting for the arrival of the host did his best to amuse the count's other guests by telling them of some of his experiences. He mentioned how interesting it was to hear the confessions of sinners, and added piquancy to his talk by saying that his first penitent was a murderer. When the count arrived he was very glad to see his friend, and turning to his guests, remarked that the abbé was one of his oldest friends. "In fact," he concluded, "I was the abbé's first penitent." The guests could draw only one conclusion. The count had proclaimed himself a murderer. There was no possible room for doubt.

But we are not always in a position to adopt this tone of certainty. We have to balance one thing against another, and come to a conclusion that seems on the whole the most probable in the circumstances. This process of trying to get at the truth by estimating probabilities is not open to the objections usually brought against guessing. If you are asked some question the answer to which you do not know, and make a shot at random, this is guessing, and is objectionable. But if you have some reason for giv-

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## *A Guide for All Students*

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ing one answer rather than any other, you cannot be said to be guessing in the bad sense of that term, even though you are not at all sure that your answer is right. Guessing in the better sense of the term may be said to be the jumping to a conclusion on insufficient grounds, but with a full knowledge of the uncertainty of the result. The conclusion is the best we can reach with the material at our disposal. This form of guessing is not to be discouraged. It is a step towards the solution of a problem, as is suggested in the lines :

“The golden guess,  
That’s morning star to the fair round of truth.”

What scientific men call hypothesis is merely a carefully guarded form of guessing. If we assume a certain state of affairs such as seems likely to explain a particular fact, and then test the state of affairs to see how far it does explain the fact and how far it is consistent with what we know of other things, we are said to form an hypothesis and to test it. Between the random shot with no justification and the reasoned certainty that we have in applying the Laws of Thought there is to be found a wide range of answers of varying degrees of certainty, and the manipulation of this doubtful region is the realm of practical thinking.

By practical thinking we mean that kind that leads to new knowledge. There is a kind of thinking that consists in bringing out clearly what is implied

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## *Making the Most of One's Mind*

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in what we know already. When we think in this way, we are said to think deductively, and we have the encouraging assurance that in deduction we cannot go wrong. If we are assured that all dogs have the heart divided into four compartments and that our Cæsar is a dog, then we can infer with absolute certainty that our Cæsar has his heart divided into four compartments. Here we pass from two statements called *premises* to a third statement called a *conclusion*, with the absolute conviction that if the premises are true the conclusion cannot help being true. If all great admirals are blind of one eye, and if Blake is a great admiral, then nothing can shake the belief of the deductive logician that Blake has only one eye. It is of no use pointing out cases of great admirals who are not blind of an eye. The logician repeats, "*If all great admirals,*" etc., *then* Blake must be blind of an eye. If the premises are true the conclusion must be true: but for the truth of the premises the logician of this type does not hold himself responsible. Let others see to that.

It is in securing the truth of the premises that we engage in what we have called practical thinking. If we confine ourselves to deductive logic, we shall certainly never make any mistakes. We shall attain to greater clearness about what we already know, and this is rather an important matter; but we shall make no progress: we shall never get any further forward. The kind of logic that takes a little risk of error, but promises a chance of progress, is called

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## *A Guide for All Students*

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inductive. All our reasoning in deductive logic depends upon the truth of the statement that, "whatever is true of a whole class is true of every member of that class." No one can deny this truth. It is self-evident. When we say that every member of a class possesses certain qualities it is only saying the same thing over again to maintain that any one member of that class possesses these qualities.

In induction there is a corresponding general statement on which all our reasoning is based, and this is that nature acts uniformly: that is, that whatever happens under certain conditions will happen again in exactly the same way if all the conditions are repeated exactly as they existed in the first case. Our belief in the uniformity of nature is strong. All our experience strengthens us in our faith in the uniformity with which she works, but we do not have that absolute certainty that we have about the workings of deductive logic. These depend on the applications of the Laws of Thought as Thought, and we have found that no one can even think of denying these. In induction, on the other hand, we depend practically on our experience, and our experience frequently misleads us, because we are not always able to interpret it aright. Men's experience showed them for centuries that swans were always white, but by and by it was found that the swans in Australia are black. So that centuries of experience are not enough to make us quite sure of conclusions that we reach by induction.

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## *Making the Most of One's Mind*

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The black swan supplies a very good illustration of the working of the two kinds of logic. With a black swan before him, the deductive logician goes through his ceremonial:

All swans are white.

This creature is a swan.

Therefore this creature is white.

The common-sense person objects that the creature is obviously black. All that the deductive logician has to say is that if it is black it is not a swan, and he is quite right: for deductive logic always starts with an agreement about the terms used. It is quite true that if the term *swan* includes among the other recognized qualities that of whiteness, then the blackness of this creature precludes it from sharing the name of *swan* with other creatures that do fit in with the definition deliberately adopted. It is left for the inductive logician to point out that this black creature has all the other qualities that are essential to swanhood, and that therefore the definition of swan should be so changed as to include this black specimen.

We thus see that Induction takes upon itself to modify premises. It seeks to provide new material that enables us to pass on to new generalizations. Naturally it wants to be as sure of its ground as is possible under the circumstances. It cannot get rid of all chance of error, and must be prepared for occasional mistakes, but by taking reasonable precautions it reduces the chance of error to a minimum.



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## *A Guide for All Students*

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One of the chief precautions is to see that we do not draw an induction from too few cases. We want to have a great number of examples before we come to a general conclusion. A child lets a book fall and finds that the binding has been injured, and that part of the paper pasted on the inside of the cover has been torn off, revealing a picture underneath. The picture happens to be there merely because the binder, in using scrap-paper, chanced upon a bit that had a picture on it. The child, however, being unacquainted with the conditions of wise induction, at once jumps to the conclusion that if you remove the paper from the inside of the covers of a book you will disclose a picture. After injuring a few books without disclosing another picture, the child finds it necessary to reverse his first decision, and thus learns one of his first lessons in applying the inductive method.

There must be a sufficient number of cases to warrant us in drawing a conclusion, but however great the number of cases we can never be quite sure that an exception may not occur at any moment; so we must be prepared to consider whether there is any value in a rule to which there are exceptions. Obviously such a rule may be of the greatest practical service. It is very important to know how to behave "in most cases," even if we cannot reach a rule that will work in all cases. It is only natural that the fewer the exceptions to a given rule, the greater reliance may be placed on that rule. Yet it is just

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## *Making the Most of One's Mind*

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those rules that have very few exceptions that are most apt to lead us into serious difficulties. For in cases of this kind we are apt to depend too much on the rule. It works almost always with excellent results, but when it does fail we are apt to be led to disaster; whereas, with a rule that is less reliable, we are always more or less on our guard, and therefore less likely to make a complete smash.

There is another consideration that ought to have weight with us in our use of induction. We must take account of the natural connexion between different phenomena. If on three different occasions we return from a week-end visit to an aunt to find that something has gone wrong with the plumber-work of our house, we will do wisely to content ourselves with a remark on the curious coincidence. There is no natural connexion between aunts and plumber-work. But if, after each of the three occasions on which we have eaten a new kind of cereal food, we experience an internal pain, we are entitled to connect the food with the pain and to take measures accordingly. Food and internal pain are frequently related to one another as cause and effect. Superficial resemblances, too, are apt to produce misleading conceptions. Thus it is not uncommon for a child to think that milk is white because it comes from a white cow, if the first cow that comes into his experience is of that colour. Such a child will often express great surprise the first time that he sees white milk coming from a brown cow.

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## *A Guide for All Students*

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This last example suggests a special kind of induction that is of practical interest because it is so frequently used in ordinary life. It is called analogy, and has given rise to an inordinate amount of quarrelling among philosophers. Here we need not enter into the details of the arguments about its exact nature. For practical purposes it may be marked off from ordinary induction by the fact that while induction is based upon a great number of different cases in which the same law is seen at work, analogy is usually regarded as limited to two cases that resemble each other in a certain number of points, and because of this resemblance are assumed to be alike in certain other points. If we compare the planet Mars with the earth and find that the two resemble each other in a great many respects, such as size, rotation, distribution of land and water, conditions of temperature and atmosphere, we may by analogy infer that Mars has inhabitants somewhat like ourselves. As a rule, analogy does not lead to a very definite conclusion, but is rather useful in indicating general similarities and probable uniformities. The great danger of analogy is that of choosing two cases that have a certain number of resemblances that are really superficial, and drawing conclusions as if the two cases were fundamentally alike. We are very apt to carry over from the one case to the other, elements that are quite incongruous in the new set of circumstances to which they are transferred. Thus, when it is argued that under our present laws

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## *Making the Most of One's Mind*

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a wife is merely an unpaid servant, elements are introduced in the case of the wife that are quite foreign to the case of the servant. The important point to be kept in view in analogy is that it is sufficient if the two cases can be shown to be parallel in the points that are essential to the matter under discussion. If, for example, the flow of ideas through the mind is compared to a stream it is a silly objection to say that this is incorrect, since ideas are not *wet*.

We have seen that by experience, observation, induction and analogy we acquire certain materials for the framing of premises by means of which we may reach clearly expressed conclusions. But in the course of our ordinary life we are not so much concerned with finding out and enunciating general truths as in making practical applications of these truths. No doubt these general truths are there, but they are very frequently acted upon without being clearly realized, and practical persons are sometimes inclined rather to pride themselves on not troubling with general principles, and on confining themselves to methods that they have found to work. This is the attitude of the person who works by rule of thumb, and by the results of actual experience unguided by thought. People of this type who have acquired a knowledge of big words like to call themselves empirics: other people call them quacks.

It has to be remembered that it is possible to use all the machinery of thought and remain intensely

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## *A Guide for All Students*

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practical. What is commonly called practical thinking is differentiated from any other kind of thinking only by the fact that it has a definite practical end which is obvious to other people. But there is only one kind of thinking, whether the process ends in discovering the best way of mending a boot, or in the solution of a metaphysical problem. Thinking has been defined in many ways, but the definition that best suits our present purpose is "the application of means to ends, so long as we work by means of ideas." We cannot be said to think when we merely fumble. If the clock on the mantelpiece has stopped, and we have no idea how to make it go again, but mildly shake it in the hope that something will happen to set it going, we are merely fumbling. But if, on moving the clock gently so as to set the pendulum in motion, we hear it wobbling about irregularly, and at the same time observe that there is no ticking of any kind, we come to the conclusion that the pendulum has somehow or other escaped the little catch that connects it with the mechanism, we have been really thinking. From the fact that the pendulum wobbles irregularly we infer that it has lost its proper catch. From the fact that there is no ticking at all we infer the same thing, for even when there is something wrong with the clock that will prevent it from going permanently, if the pendulum is set in motion by force from without it will tick for a few seconds before it comes to rest again. The important point to observe is that there must be inference. This is

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## *Making the Most of One's Mind*

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always indicated by the word *therefore* or its equivalent. If you reach a conclusion without having to use or at any rate imply a *therefore*, you may take it for granted that you have not been really thinking, but only jumping to conclusions.

Not all fitting of means to ends is thinking. The story is told of a man who set out with his dog to have a sail. His boat was about a mile from home, and when he reached it he was disappointed to find it three-quarters full of water. His chagrin was increased when he found that the dipper was not there, so that it was impossible to bale out the water. Unwilling to walk the mile home to fetch the dipper, he thought he would enlist the services of the dog. Looking at the animal, he put his hollowed hand into the water and threw out a handful or two, in the hope that the dog would understand that the dipper was needed. The dog nodded, went home, and returned with the dipper. This is so wonderful that the ordinary reader is apt to be a little incredulous. But the story is vouched for by a competent psychologist whose comment, however, is that it was not a case of thinking at all, but only the completing of a picture previously seen by the dog. On many previous occasions the dog had seen the same picture—his master, the boat, the water, the dipper, the water being thrown out. The picture on this occasion was incomplete, for the dipper was lacking. What the dog did was merely to complete the picture to which he had become accustomed. He was fitting means

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## *A Guide for All Students*

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to ends no doubt, but not by the use of ideas. There was no *therefore* in the case. Had there been real thinking, it would have gone something like this. The dog reaches home, and to his disappointment does not find the dipper in the outhouse where he expected to see it. There is nothing that looks sufficiently like the dipper to be substituted for it on its mere general resemblance. Is there anything else that will serve the master's purpose? Well, there is the sponge in the bath-room. If it were dipped in the water it would take up a great deal, which might then be squeezed out, and in this way the boat might be emptied almost as quickly with the sponge as with the dipper. Had the dog acted upon these considerations and returned with the sponge, the exacting psychologist would have admitted that there had been a case of thinking.

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## CHAPTER V

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### MODE OF STUDY

WHEN you go into your study you intend to work with your mind, but you must bring your body along, and the problem is how to deal with it during the study period. The least you can do, one would think, is to treat it as you would any other visitor, and offer it a chair. But not every one is of this opinion. There are those who point out that it is more profitable to stand than to sit while studying, and there are others who go still further, and maintain that a certain amount of gentle motion stimulates the brain. Some students walk up and down the room as they study, while others content themselves with some nervous motion or other, such as fidgeting with their hands, resting now on the right leg, now on the left, moving the head from side to side, twirling a pencil between the fingers—there is no end to the vagaries.

Now this is one of those cases in which it is dangerous to lay down hard and fast rules. What is excellent for one, may be disastrous for another.



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## *A Guide for All Students*

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All that we can do is to consider the matter as a whole, indicate what suits the greater number of persons, and leave you to make your own applications.

A good deal depends upon whether you have a room of your own. If you have to study along with some one else, or worse still, have to study while there are other people in the room doing the ordinary things that people who are not students are in the habit of doing, your problem is greatly complicated. If you are with another student you must make a treaty with him offensive and defensive, by which certain fixed study periods are to be regarded as sacred from all interruptions, and during which nothing less than sudden illness or an alarm of fire will justify the opening of a conversation. Your time-table must be the result of agreement with your fellow, and must be made the basis of the treaty. How far you should enter upon coöperative work is a matter for serious consideration. A partnership in study almost invariably resolves itself into one of the partners becoming the teacher, and the other the pupil. This is not so serious a drawback as it looks, for the student who turns out to be the tutor does not really lose: he proves the truth of the Latin tag *discimus docendo*, for by teaching he learns: while the student who becomes pupil has obviously no right to complain. A partnership is inadvisable in the case of great inequality in ability or attainments between the two

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## *Making the Most of One's Mind*

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students. Here the pupil-partner becomes an unfair drag upon the teacher-partner.

A studying partnership has to be carefully manipulated. There is a strong tendency to an unwise division of labour. One partner will keep the text in his hand and try to worry out the meaning, while his friend attends to the dictionary and looks up all the necessary words. The result is that by and by each becomes a specialist, and does his part of the work exceptionally well, while he is all at sea in the work of the other. In a case like this, the two become a kind of compound unit, a sort of social molecule made up of two formerly independent atoms. If the object of the partnership were the production of good translations in the shortest time, then the partnership would be justified; but since the purpose is that each should become a well-developed all-around scholar, the plan of working must be modified. There must be alternation in the distribution of work, so that each acquires facility in all branches.

There is sometimes a very real advantage in co-operative study between fairly well matched students, even if they do not have to work together because of the necessity of using the same room. This is particularly the case with private students. There are many points on which mutual criticism is of the utmost value, even though neither is an authority on the subjects studied. The value of a fresh eye on our difficulties is great. We have seen the value

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## *A Guide for All Students*

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of a co-worker in the chapter on *Memory*, and we shall find other cases under *Reading* and elsewhere. Further there are many occasions on which we require to get an outsider to state a case, or to suggest a datum for a problem. The private student is sometimes in the position of those pitiable people who play games against themselves—left hand against right—in which the whole process is vitiated by the fact that the plans of both sides are known to both players. A study partner may be as welcome to a student as an opponent to an enthusiastic chess-player eager for a game. Not the least of the functions of the student-partner is the service he renders as a sort of external conscience. We are much more easily satisfied with our own excuses for slackness than our partner is likely to be. Just as a man's wife is often an objective conscience to him, so a student's partner may do much to keep him up to a high level of endeavour.

But while we can thus turn to a positive advantage the presence of a fellow student in our room, it is a case of making the best of a bad job when we have to share a room with other people who have no special concern with our studies. If you have to work in the common living room at home, you will at least have the advantage of some degree of sympathy with your work. If there are other members of the family who have to be studying at the same time, you will probably be in a position to demand a fair degree of quietness from those who are not

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## *Making the Most of One's Mind*

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studying. A common room of this kind is a useful arena for struggles in self-sacrifice. But it also offers many opportunities for intelligent manipulation. You have to examine very carefully all the conditions of the case—especially the times and needs of the other members of the family. There is one outlet that is nearly always available unless the family is very poor indeed. This is the somewhat unpalatable expedient of early rising. If you have to work along with younger brothers and sisters, and find that you cannot make real progress, you will find that by going early to bed and getting up very early in the morning you are likely to find all the solitude you want. The one condition is the cost of a fire on the winter mornings—the kindling of the fire would be of course your contribution.

Coming now, however, to the case of the student who has a little room for his own use, we have to settle the question of the disposal of the body. Speaking generally it is better to sit than to stand. To be sure it is highly desirable to have the means of standing for a little now and then to relieve the weariness resulting from long continued sitting. If you can afford a sloping desk-table that is just breast high you will find it a great boon for general reading, but particularly for consulting dictionaries and other heavy volumes. The table need consist of nothing but four legs and a sloping board, but the board should have a rim at the lower end to prevent books from slipping off.

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## *A Guide for All Students*

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With regard to the kind of seat you ought to have, there is a difference of opinion. The first view is that we ought to treat our body severely. People do not put the matter quite so plainly as this, but what is clearly at the back of their minds is that for sound study the body ought to be a little uncomfortable. The opposite view naturally is that the body ought to be made as comfortable as possible, so that the mind may be left perfectly free to do its hard work. But neither view can be pushed to extremity. No one nowadays would maintain that the body should be made positively uncomfortable so as to help in study, though there was a time when such a view would not have been considered unreasonable. On the other hand, no one would recommend that the body should be pampered. The truth naturally lies between the two. We must not be *positively* comfortable: that is we must not be so comfortable as to be tempted to think about how comfortable we are. You may be quite comfortable sitting in an ordinary armchair, but if it is so deliciously padded that you want to snuggle into it, so as to enjoy it the more, it has passed the stage of respectable comfort. As a matter of fact the chair in which you do your ordinary study should have no cushion at all, unless you find the lack of a cushion positively *uncomfortable*. For, after all, it is your body that has got to be considered, not the body of any one who comes along to give you advice. He may prefer a hard chair when engaged in serious

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## *Making the Most of One's Mind*

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work. You may find such a chair a hindrance. The principle to determine the matter is that everything should be done to secure that the body does not make its presence felt at all, either by discomfort or by comfort so exuberant as to call attention to itself.

The attitude adopted during study is of some consequence. There is a subtle connection between the attitude of the body and that of the mind. Edward Thring, the distinguished Head Master of Uppingham, used to speak often about "the potency of attitude," and pointed out that a boy who came up to the blackboard with his hands in his pockets did not attack a problem in geometry with anything like the same effectiveness as his fellow who held himself erect, and looked as if he meant business. Probably Buffon, the celebrated French naturalist, carried this theory too far when he made a point of always doing his writing in full court dress, sword and all. Yet there is a certain connection between the official dress, and the stately style of this writer. There is said to be a sort of dressing-gown frame of mind that is apt to be put on along with that soothing garment. Naturally it is out of the question to lay down any hard and fast rules for the dress of students. The days of sumptuary laws are gone for ever: but there is no harm in calling attention to possible dangers. If your temperament is such as to be greatly modified by your immediate surroundings, it will be to your interest to keep an eye on your attitude as you set about your studies.

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## *A Guide for All Students*

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Better study has been done in old clothes than was ever done in court dress, but a slovenly attitude is not necessarily an accompaniment of old clothes, and such an attitude is apt to induce a slovenly mental attitude to match. Besides, slovenly attitudes in over-easy arm-chairs are apt to have an unwholesome effect even from a purely hygienic point of view. You must be allowed to adopt whatever attitude you find from intelligent experiment to be the best for your particular case. But you will be well advised to give a long trial to an attitude that suggests as well as accompanies alertness of mind.

Assuming that you have hit upon the happy mean between discomfort and luxury, your next problem is how to carry on the actual process of study. You have your books, your papers, and your prescribed work. You have planned out your time, and you know that you have forty minutes to master a particular bit of work. Let us assume that this is a case of study that is mainly assimilative. You have to "get up" the reign of Henry VII of England in such a way as will justify the statement that "Modern History in England begins with the reign of Henry VII." You have read the reign in a general way during a previous course, so your present study takes the form of revision, with the additional incentive of a definite thesis to be maintained. You will first glance over the various paragraphs to revive your general impression of the whole, then you will select certain paragraphs for special atten-

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## *Making the Most of One's Mind*

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tion. You pass rapidly over everything that treats merely of local and temporary interests—revolts, personations and what not—and fix your attention on the big things. You note that America was discovered in 1492, that the Renaissance which may be said to have begun in the middle of the fifteenth century was producing its fruit when Henry came to the throne, that the Reformation was making headway on the Continent, greatly aided by the spread of books resulting from the development of printing, that the increased use of artillery had brought the knight down almost to the level of the ordinary man-at-arms on the battle field. But all this you feel does not specially concern England, so you continue the search for something that brings this material to bear upon English life, and you find it in the decay of the power of the old nobility, through the general cause of the new conditions of warfare, and the cause, special to England, of the decimation of the noble families through the sanguinary struggles of the Wars of the Roses. You give a fresh revision to the paragraphs that deal with the enforcement of the Statute of Liveries, and the revival of the *criminal* jurisdiction of the Crown, the New Learning, the Oxford Reformers; and now you feel that you have enough matter to sustain the thesis that with Henry VII began such a set of new problems as entitles us to say that modern history begins in England with his reign.

In all this your mind has moved backwards and



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## *A Guide for All Students*

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forwards over the whole field, pausing sometimes here and sometimes there. Some paragraphs have had much more of your forty minutes than the others, some have been passed over almost unread. The dominating purpose of the study has been to select the proper material and deal with its different elements in the order of their importance.

If your purpose had been to master the reign of Henry VII as a whole and for the first time, you would have proceeded differently, since this would have been a case of purely assimilative study. In such a case you would read over the whole rapidly, but of course not carelessly, in order to get a general idea of it. Then you would select certain paragraphs for a second reading because of their difficulty, or because your first reading showed them to be important. Next you would read the whole over again, giving as before special attention to the important paragraphs and noting anything that seemed to call for special treatment. Then you would proceed to ask yourself certain questions about the whole, and test whether you could answer them. Usually as you advance in a lesson of this kind you have to concentrate more and more on the uninteresting. Much of the striking material you master in the first reading. It is a very common mistake in preparing such a lesson as this to re-read the whole reign several times in succession, giving the same attention to all the parts, the easy getting the same attention as the difficult. The secret of study is to seize

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## *Making the Most of One's Mind*

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upon the important and the difficult parts, and concentrate upon them.

You must of course realize that your work will be judged by your success in mastering your subject. The test of study is not how long or how hard you have studied, but what you have attained by your study. There is nothing that a half-conscientious schoolboy likes better than to get a definite ruling from his teacher about the amount of time to be given to a particular lesson. He will innocently ask how often he ought to read over his history lesson, or how frequently he should repeat his multiplication table in order to satisfy the demands of the school. The wise teacher never gives a definite numerical answer to such questions. If he does, the boy will in all probability accept his decision and loyally go over the lesson the exact number of times recommended. But the chances are that the number of repetitions bulks too largely in his mind. The responsibility is somehow shifted on to the teacher, if only the required number of repetitions is given. If next day the boy breaks down, he may not make any open complaint to the teacher, but in his heart he thinks that he has been badly treated. Accordingly the wise teacher answers all such demands for a numerical prescription by telling the pupil that he will have to go over the lesson often enough to master it. The responsibility must be left with the pupil.

The interesting thing is that the intelligent pupil

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## *A Guide for All Students*

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does know when he has mastered a particular bit of work. Without doubt you have felt this in your own experience. You have been working at a particular matter—not necessarily a problem with a definite “solution” that is recognized as right the moment it has been reached—for half an hour; almost suddenly you realize that you have mastered the position: you “know” the lesson. A few minutes before, you were quite well aware that you did not know it, but now the conviction has come to you that you do know it. No one can help you in such things. You must learn to know your own processes by experience. To some extent this applies also to the way in which you set about learning anything. It appears that we all differ in our mode of learning, and our teachers cannot lay down any very definite directions that we ought all to follow. In some cases, however, they can give definite instruction about how to carry out a particular bit of work.

On one occasion a teacher told his class that had just begun the study of formal Geography to “Draw a map of England.” This was not a very wise proceeding. The pupils had never drawn a map before; most of them were quite at sea, and had no idea how to begin. I can tell you exactly how one of them began. He examined the map in his atlas, and noticed that it was made up of a great number of little rectangles. He did not know that these were made by the crossing of the meridians and the parallels of latitude. So he carefully measured off

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## *Making the Most of One's Mind*

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each of these little rectangles, and completed as much of England as lay within each. In other words he proceeded to make a map of England as if it were a sort of geographical crazy quilt. The teacher told the class afterwards that he could not understand how any boy could be so stupid as to do such a thing. But this complaint was not very sensible. It is a teacher's business to understand how pupils can do stupid things. But it is also your business, so far as you take yourself in hand, to learn to avoid foolish beginnings like this little boy's. He did not really face the problem as a whole. A careful examination of his atlas would have shown him that England was not made up of separate segments: that there was a continuity of outline: that the thin lines making up the rectangles were continuous, and that these lines could be most comfortably drawn by measuring the spaces between them at the top and at the bottom of the map, and then joining by straight lines the marks made at the top with the corresponding marks at the bottom. The same thing being done with the horizontal lines, he would have found the little rectangles very useful as guiding lines in his drawing out the contour.

We shall have other examples of the folly of beginning a problem with no knowledge of what is really wanted. The teacher cannot be expected to state every detail of a problem, but the problem itself must be made quite clear, and the pupil should never be in the least doubt about what is required

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## *A Guide for All Students*

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of him. Though the teacher cannot be expected to give detailed instructions about the working out of problems, he can at least give some very general directions that are applicable to all cases of study. For example, he can warn his pupils against the most dangerous habit of all—the habit of inattention. When we say that a person's wits are wool-gathering, we mean that his mind has wandered away from the matters in hand. No human being will ever succeed in study or in anything else who allows this habit to grow upon him. This does not mean that we must be on the stretch all the time, that we must never allow the mind to wander at ease among the things of the past and the distant. There is a place for reverie; and even day-dreaming is not altogether to be condemned. The important thing is that during the period that you profess to be studying you must study. Wool-gathering during study-time is fatal to all chance of success. One hour's strenuous study is worth three during which there are occasional lapses into reverie or day-dreaming. Students are very apt to point out how many hours they study per day. But this is meaningless unless we understand what kind of study it has been. It is quite possible to read a book and to turn over the pages systematically as you reach the bottom of each, and yet to know nothing of what you are reading. A student of the wool-gathering type may be reading a textbook in preparation for an examination. He is actually following the words on the

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## *Making the Most of One's Mind*

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page, for the observer can note how his eyes move backwards and forwards. Yet if a sheet of paper be thrust between his eyes and the book, and he is asked some question on the text, it will be found that he does not in the least know what he has been reading about. His attention has been elsewhere all the time. This kind of study is not only useless; it is worse than useless, for it actually cultivates the lack of power to concentrate our attention at will.

Those who write on such matters quarrel a good deal about the naming and nature of the different kinds of attention. They talk about voluntary attention, involuntary attention, non-voluntary attention, spontaneous attention. But for our purposes it is enough to have two kinds of attention—one that implies effort and one that does not. Many things we attend to naturally, easily, and without the least effort. This kind of attention may be called spontaneous. But there are many things that we find it necessary to attend to that are not in themselves attractive. If they are to get a fair share of our attention we must make an effort, we must exercise our will. That is why this kind of effortful attention is commonly called *voluntary*. This adjective does not mean that we attend willingly: we would much more willingly attend to more attractive things. It means rather that we attend by force of will: we compel ourselves by sheer will-power to attend to things that are in themselves

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## *A Guide for All Students*

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unattractive, because we realize that these unattractive things are very important for us.

It is sometimes said that voluntary attention is a higher form than spontaneous, and that therefore the student should seek to rise from spontaneous attention to the voluntary form. But it might be more truly said that the object of education is to enable the pupil to pass from the voluntary form of attention to the spontaneous. Surely it cannot be the aim of either teacher or pupil to do something that will make attention more difficult. The better educated the student, the more easily ought he to be able to direct his attention wherever he chooses.

The relation between spontaneous and voluntary attention will be better understood when we consider the meaning and place of what is called interest. Certain things appeal to us, draw out our sympathy, rouse us to pursue them, all because in some way they concern us. Interest literally means being mixed up with or connected with something. Whatever in any way affects our activities is of interest to us. We are not to suppose that to be interesting is the same as to be pleasing. We are interested in a great many things that are extremely unpleasant. There is probably no place in the world more interesting than the dentist's chair. There you have no difficulty in maintaining attention. No effort of will is required. Your attention is perfectly spontaneous. As a matter of fact things go farther than that. Not only do you need no effort of the will to attend, but

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## *Making the Most of One's Mind*

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you are made to attend practically against your will. Very gladly would you attend to something else, but the circumstances of this case compel you to attend to what the dentist is doing. This kind of attention you may call, if you like, involuntary attention, or attention against the will. Still, there are only the two kinds of attention that are important so far as we are concerned. For in spontaneous attention there is no exercise of the will at all, whereas in voluntary attention the will is always making an effort. In what is called involuntary attention the will desires to attend to something, say *a*, and is compelled to attend to something else, say *b*. It implies effort, though unsuccessful effort. It is therefore of fundamental importance to learn what help we can get in our struggles to keep our attention fixed in whatever direction we may desire.

Experiments have been made to determine how long we can maintain attention by the sheer exercise of the will, that is how long we can attend to something that has no interest whatever for us. Suppose you concentrate your attention on some totally uninteresting thing, say the point of a needle, how long do you think you can maintain this voluntary attention? Remember you are to attend to nothing else but the point of the needle. You are not to think, for example, of the use of the needle, or the pain that the point would produce if you pricked your finger with it, or of the owner of the needle, or its maker, or its price, or its material—but merely



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## *A Guide for All Students*

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of the point of the needle. You will find that even by a violent effort you are able to maintain this sort of unnatural attention for only a few seconds at a time. After that, either your mind wanders around the subject, seeking for points of interest, or you become dazed and find yourself attending to nothing at all.

If, then, you can use pure voluntary attention for only a few seconds at a time, it is surely impossible to carry on your studies by this means. The truth is that unless spontaneous attention comes to the aid of voluntary attention, steady study is impossible. It is certainly true that voluntary attention marks a higher level than spontaneous. Unless we are able to exercise voluntary attention we can hardly claim to be the captains of our own souls, and we are not to think that the very limited time during which we can maintain pure voluntary attention in any way diminishes the importance of this form. Its function is to give direction to the activities of the mind. The helm is not the most imposing part of a ship, and yet it controls all the rest. Voluntary attention plays the part of helm. It turns our activities in this way and in that, but it depends upon other forces to supply the motive power. Interest is the driving power that corresponds to the wind in the case of a sailing ship, and to steam or electricity in the case of the other kinds. The moment interest is introduced the attention ceases to be purely voluntary and becomes to some extent at least spontaneous.

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## *Making the Most of One's Mind*

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The more interest the greater the degree of spontaneity.

When you sit down to a disagreeable subject, you are unable to get up much interest, and in consequence you have to depend largely upon voluntary attention. You work for a minute or two, and then find that your attention has wandered. You pull yourself together, and compel yourself once again to attend. The less interesting the subject the more frequently you must use the whip of voluntary attention. Any little interest that you can get up in the subject is of the greatest possible help. Unfortunately interest is a treacherous ally: it works on both sides. It distracts as well as helps to concentrate. If in working at your textbook in Physics you find yourself reading the advertisements at the end, or if in dealing with an arithmetical problem about the cost of papering a room you find yourself wondering about the colour of the paper and the sort of man who is going to live in that room, interest has played you false. But of the two it is noteworthy that the first lapse is much worse than the second. There is less connexion between Physics and the advertisements than between the colour of the paper and the wall space of the room. There is less hope for the student who listlessly turns the pages of the book than for the one who only allows his imagination a little too free scope in playing around his problem.

Fortunately for the student, interest has a tendency

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## *A Guide for All Students*

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to rise out of the very material studied, whenever enough time is allowed for it to develop. It is the function of the voluntary attention to secure this opportunity for interest to develop. At the beginning of a period of study in a disagreeable subject the appeal to the voluntary attention is rather frequent. The mind is continually letting itself wander and needs repeated calls to order. But as the work goes on the periods of spontaneous attention increase in length, and by and by there is need for only an occasional appeal to the voluntary attention.

There is a fact in natural history that is often used to encourage young people to face disagreeable work. At least I hope it is a fact, for I cannot say that I have ever verified it on its literal side. We are told that if we deal with a nettle gingerly we get badly stung, but if we "grip it like a man of mettle" we escape all disagreeable consequences. However it may be with nettles, it is undoubtedly true that firm treatment of disagreeable subjects leads quite rapidly to an amelioration in the disagreeableness. It is probably the swing effect more than anything else that eases our way, and it is obvious that the fewer relapses into other matters the greater the chance of the swing to establish itself. The effort at the beginning is great—there is no sense in blinking the disagreeable fact—but the reward is in proportion. There are few joys to surpass the satisfaction we experience when we wake up to discover that we have been absorbed

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## *Making the Most of One's Mind*

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for half an hour in a subject that we dislike. Yet this absorption is the almost inevitable result of the resolute struggle against distraction during the first quarter of an hour of a three-quarters of an hour period of dealing with an unattractive subject.

Talking of being absorbed in a subject raises the question of the possibility of maintaining attention at the same level all the time. Experiments in psychological laboratories have shown that attention is rhythmic, it has a regular rise and fall. There are beats of attention just as there are beats of the heart. As we have the alternation between inspiration and expiration in breathing, so we have an alternation between concentration and diffusion in the process of attention. In fact some psychologists maintain that there is a definite connexion between the beats of attention and the rhythm of breathing. That there is some connexion between breathing and attention is plain to all, and is acknowledged by the very words we use in describing attention. Do we not speak of "breathless attention"? Are we not all familiar with the gasp that the crowd gives on the finish of a particularly striking display of fireworks? The brilliant lights command such concentrated attention that we all hold our breath till the lights die down, and our attention is once more set free. But this more or less physical side of attention, though interesting to us, cannot be manipulated to our advantage. It is little good to say to ourselves, "Now I want to attend: so I shall hold my breath." It is

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## *A Guide for All Students*

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rather the attention that causes the holding of the breath than the holding of the breath the attention; though perhaps the best way of putting it is to say that the two form part of one whole, and cannot be dealt with separately.

There is, however, another form of rhythm of attention in which the rhythm is not quite so regular, but in which we have greater power of control. When we are studying a subject we are apt to think that the concentration beats are what really matter, and that the diffusion beats are really periods of rest. When we watch a painter at work we observe him going up to his canvas and putting in some fine touches with a delicate brush. This is his concentration beat, and we are inclined to say to ourselves, "Ah, now this is working, this is the real thing!" By and by he strolls back a bit from the canvas and takes in the general effect. "This," we say, "is the diffusion beat, no doubt. He is having a rest. We don't grudge him the relaxation. But of course it isn't work." But this is where we go wrong. The artist may be working just as hard, and may be using up quite as much grey matter in the brain when he estimates the general effect from a little distance as when he is working at close quarters and peering into the canvas. When we say that attention has two beats, we must not forget that both beats are beats of attention. We are not to suppose that the concentration beat means the presence of attention and the diffusion beat its absence. To be sure,

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## *Making the Most of One's Mind*

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we do have this alternation between attention and distraction. When, for example, we are beginning a disagreeable subject, we have already seen that every now and again we have wandered off to something else. This implies a real loss of attention to the subject we are studying, and we have to depend upon voluntary attention to bring us back to the point at which we strayed away from our subject. But in a case in which we are attending to the same subject throughout a whole lesson period, and have no strayings away from the subject in hand, we have yet a more or less regular alternation of the concentration and diffusion beats.

The word *concentration* is perhaps a little misleading here. We are too apt to think that attention always means concentration on a small area. A geologist has two main kinds of work: one is done in the field, the other in the laboratory. When you meet a geologist at work in the field, you are very likely to make the mistake of thinking that he is out merely for a stroll. He may have his hands in his pockets, he may be leaning over a gate and apparently doing nothing but taking in the beauty of the scenery. He may even be smoking as he goes along. If, however, you visit him in his laboratory, you may quite likely find him poring over a microscope, or at the very least busy with little specimens of minerals to which he is giving his close attention. This you feel to be work. This is what you understand by concentration. But you

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## *A Guide for All Students*

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have to realize that concentration is a matter of the mind, and not of the area over which the mind is working. A man's mind may be as concentrated in trying to take in the meaning of a whole landscape, as in seeking to identify a particular mineral under the microscope. Indeed even in connexion with the microscope students are sometimes misled into thinking that there is greater attention implied in using the high powers than the low. But in using the seventy power, the observer may be attending quite as intently as when using the eleven hundred power. No doubt the higher power may imply a greater amount of physical strain on account of the diminished quantity of light. But this is a matter of physical conditions rather than mental.

Concentration, then, we are to regard as referring to the whole subject we are studying at any time. To understand that subject we may have to take now a wide, now a narrow view. But so long as we do not lose sight of the main object we have before us we can claim to be attending all the time. Attention may be diffused as to its area but concentrated as to its purpose. With this explanation we may be perhaps permitted to use the terms concentration beat and diffusion beat, to indicate the narrower or wider area to which attention is applied.

In spite of all that has been said, it is probable that you have at the back of your mind the feeling that after all real attention is the kind that is marked

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## *Making the Most of One's Mind*

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by a screwing up of your forehead and a severe limitation of the area within which you restrict your thoughts. On your side is the evidence of a French savant who maintains that the broad muscle that forms the brow is the special muscle set apart to give expression to the state of attention. But you can pucker your brow over a wide area as well as over a narrow one, and you may get some justification for respecting the diffusion beat by considering that we must know not only the details of anything that we are studying, but we must know that thing in its relations to other things. In our thinking we pass through three stages, the thing stage, the law stage, and the system stage. Children and savages are mainly at the thing stage. They examine each thing by itself and think of it as something by itself apart from all its surroundings. More mature thinking demands to know the relations between individual things and their surroundings. We concentrate on each thing no doubt, but immediately thereafter we let our minds play around it and try to find out how the thing stands in relation to other things. It is this playing around a subject that forms the diffusion beat. When Shakespeare is giving an account of the various qualities that make up man's excellence, he includes "looking before and after," and Shelley in his turn makes use of the same expression to emphasize man's superiority. It is because we can look before and after that we are able to understand our surroundings. We do not live from mere



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## *A Guide for All Students*

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moment to moment. We let our minds play around all that is submitted to them, and in this way get to a truer knowledge. The concentration beat gives us the details of an individual fact, but when we start looking before and after in order to understand the true meaning of the fact, we find ourselves in the diffusion beat.

Obviously both beats are essential to intelligent study. We must get up thoroughly each detail that is of importance, but we must also learn what the importance of this detail is, and how it fits in with the other details that make up the whole subject of study. In learning grammar, for example, it is not uncommon for the pupil to get up all about the substantive, then all about the adjective, then all about the pronoun, and so on, without bringing all this knowledge together. Successful teachers never allow this to happen. They are continually referring backwards and forwards and showing the relation of all the facts that have been learned. This is why revision, that you are apt to find so dreary, is so very valuable. It is a systematic looking before and after, a deliberate organization of the facts that we have mastered.

Certainly there must be no paltering with *thoroughness*. But it is absolutely essential that we should realize exactly what we mean by this term. There is great danger that by misunderstanding its true meaning we may make serious mistakes in the conduct of our studies.

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## *Making the Most of One's Mind*

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To begin with, there are occasions when we have no doubt at all in the matter. Certain facts have to be *mastered*. That is they have to be so thoroughly studied that they become parts of our very being. Facts that have to be turned into faculty are of this kind. The multiplication table, the declensions of nouns and the paradigms of verbs, the exact memorizing of verses or other verbal formulæ that are admitted to be worth memorizing—all these exemplify material that has to be thoroughly assimilated. In dealing with them we are not specially called upon to look before and after. They have to be mastered. Thoroughness demands this.

But some things are not worth getting up in this thorough fashion. Certain details in history, for example, are very valuable, since they give a clear idea of the conditions under which important events have happened. But they are not so important as those important events themselves. The terms of Magna Charta, or of the Constitutions of Clarendon, have to be mastered because of their intrinsic importance. But a great many details have to be considered in order to enable us to understand the conditions under which these documents were drawn up. In studying history, therefore, the student will naturally discriminate between what is essential and what is merely scaffolding.

It is dangerous to say anything that even seems to depreciate thoroughness. Poor human nature is only too willing to take advantage of anything that

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## *A Guide for All Students*

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gives it the slightest encouragement to adopt the easiest course. In what follows you will please keep clearly in mind that what you are being warned against is not thoroughness, but a pseudo-thoroughness, a thoroughness that is out of place. In an admirable but now out-of-date book for the use of students (*The Student's Manual*) the Rev. John Todd has the following passage in a chapter entitled *Study*:

“Passing over a field of study has been compared graphically to conquering a country. If you thoroughly conquer everything you meet, you will pass on from victory to victory; but if you leave here and there a fort or a garrison not subdued, you will soon have an army hanging on your rear, and your ground will soon need reconquering. Never pass over a single thing, however minute or apparently of little consequence, without understanding all that can be known about it. He who accustoms himself to pass over a word or sentence, or a single point of mathematical inquiry, without thoroughly understanding everything that can be known about it, will soon be known as an inaccurate scholar.”

The application is that no difficulty should be left till it is thoroughly mastered. Instead of pressing on to new matter the student is recommended to sit down before a difficulty, as a general would lay siege to a fortress. The difficulty must be mastered or the fortress taken before any advance is made. Even in warfare it is doubtful whether this policy is always a wise one. To the lay mind at any rate it appears as if the experience of the English generals during the great Boer War rather damages the

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## *Making the Most of One's Mind*

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claims of the principle. But in any case in respect of study the Rev. John Todd was wrong.

It is easy to understand what he really meant. He was so afraid of students shirking genuinely hard work that he laid down his severe rule. It is only a variant of the usual warning that there is no royal road to learning. Todd is right in not giving way to those who hold out hopes of a primrose path. Difficulties must be faced: the nettle must be grasped. But the question arises: Must it be now? To the man who knows human nature, such a question will be recognized as the most dangerous form in which the problem could be put. There is nothing so insidiously undermining to strength of character as this plea of justifiable procrastination. We are all so willing to postpone the evil hour that we welcome with something like enthusiasm the recommendation of any one who ventures to advise delay. But here I have no claim to deserve such an enthusiastic reception. I have no comforting advice in the way of avoiding difficulties. I admit that they must be faced, faced promptly, faced dourly. But we must not be foolishly dour. "Dogged does it," no doubt, but it does not always do it intelligently. There may be other ways. There may be a way round. We must not make the mistake of the English officers at the beginning of the Boer War, and sacrifice our energies by an heroic but unprofitable frontal attack. Our object is success in our studies, success, no doubt, in overcoming any particular difficulty,

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## *A Guide for All Students*

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but more important still, success in our study as a whole. We must husband our resources, and use them to the best advantage. If we have faced a difficulty squarely, worked our way all round it, looked at it from every point of view, and can still make nothing of it, we are not well advised to sit down before it, and wait for something to turn up. Yet if we are to follow the advice of the Rev. John Todd, that is all that is left for us to do.

It has to be admitted that up to a certain point he is entirely in the right. We must not pass over any element of the problem as unimportant; we must see that we understand all the details, and we must realize which are the points that we do not understand. It is one thing not to understand a detail, it is another to know that there is a detail that we do not understand. It is not always possible to follow the counsel never to pass over a detail "without thoroughly understanding everything that can be known about it," but it is always a point gained when we are able to note that there is something that we do not understand. We have made no inconsiderable advance when we know that we have a difficulty to face. For it is sometimes possible to know and understand all the details of a problem without realizing that there is a problem at all.

Granted that we know that we are face to face with a serious difficulty, we want to know how to face it. I find that the great d'Alembert, the editor of the famous French *Encyclopédie*, gave this advice

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## *Making the Most of One's Mind*

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to young mathematical students when they come up against the disheartening wall that so often rears itself up before them: "Have faith, and go ahead!" It is pleasant to find that M. Fabre, the distinguished naturalist already quoted in our first chapter, has followed his countryman's advice, with a result that strengthens our view as against that of the Rev. John Todd. Speaking of the serious difficulties in his mathematical studies, M. Fabre says:

"Faith I had, and I went on pluckily. And it was well for me that I did, for I often found *behind the wall* the enlightenment that I was seeking in front of it. Giving up the bad patch as hopeless, I would go on and, after I had left it behind, discover the dynamite capable of blasting it. 'Twas a tiny grain at first, an insignificant ball, rolling and increasing as it went. From one slope to another of the theorems it grew to a heavy mass; and the mass became a mighty projectile which, flung backwards and retracing its course, split the darkness and spread it into one vast sheet of light.

"D'Alembert's precept is good and very good, provided you do not abuse it. Too much precipitation in turning over the intractable page might expose you to many a disappointment. You must have fought the difficulty tooth and nail before abandoning it. This rough skirmishing leads to intellectual vigour."<sup>1</sup>

In order to avoid abusing d'Alembert's advice, we must ask ourselves the question: "How long must I wrestle with an apparently insoluble problem before I can give it up with honour?" The answer is that we are never entitled to give it up at all, unless, as in the case of perpetual motion or the

<sup>1</sup>*The Life of the Fly*, p. 332.

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## *A Guide for All Students*

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squaring of the circle, it can be proved that a solution of the problem is impossible. I have no comfort to give the lover of ease. There is no good saying Peace, when there is no peace. But while we must make up our minds never to give up a soluble problem, it does not follow that we should spend time unprofitably over it. Attack the problem as vigorously as you can, but do not suspend all your other operations merely to lay siege to it. A time comes when it is advantageous to make a note of our temporary failure, and move on. What we want to learn in each case is when that time for raising the siege has arrived. Now in dealing with a problem, we may be said to pass through three stages, marked by the degree of freedom with which we can manipulate the materials at our disposal.

At the first stage we bring forward a great deal of matter with which we are quite familiar. We know exactly what each bit of it means: our mind moves easily among the elements and we do not have to reason about it at all. We are here in the region of observation. We note certain things and know exactly what the bearings of those things are. As you get into the hall on returning home you say, "I see Jack's got back." As a matter of fact you see nothing of the kind. What you do see is a hat and a walking-stick. But they speak so plainly that you do not need to think about their meaning. You really *infer* from the hat and stick, that Jack must be in the house, but, as the conclu-

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## *Making the Most of One's Mind*

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sion is so easily drawn, the whole process is regarded as a matter of observation, and we say that we see or observe that Jack is at home. This stage may then be called the *observation* stage.

The second stage is marked by conscious inference, and may therefore be called the *inference* stage. Here we are dealing with things that we understand, but do not know intimately. We have to consider each fact and draw conclusions from it, and in this way make progress. The work may be slow, but we know where we are. We may not be successful at first, but if one way of dealing with the problem fails us, we try something else. We at least know what to do next. This inference stage is the most usual and interesting one in our studies. Sometimes the inference is easy, sometimes it is difficult. But we know when we are making progress. We know when we encounter a gap in our knowledge, and we know how to fill that gap. We keep our eyes and ears open, we ask questions, we read books, we use all the means in our power to reach the end we have in view. For at this stage we always do know definitely the precise object of our study.

In some cases, however, the problem becomes so difficult that we begin to lose our way altogether. It may arrive at that point at which it is beyond the reach of the materials at our disposal. When a Frenchman comes to this stage he says that he is at the end of his Latin. He has done all he can



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## *A Guide for All Students*

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think of, and does not know what to do next. So long as we can go on asking questions and making intelligent experiments, we are still at the stage of inference, though we may be getting into the upper regions of inference where the air is very rare and it is difficult to breathe. But when we have no more definite questions to ask, and no specific experiments to suggest, we have reached what I like to call "the gaping point." People often find themselves at the gaping point in dealing with a very badly written letter they have received. After making all manner of inferences based upon the post-mark, and the signature, and whatever words they are able to make out, there comes a time when there is nothing more to be done than gape at the letter, turn it upside down, look at it sideways, carry it about in the pocket, and occasionally pull it out quickly to see if by any chance it is possible to take it by surprise, and get at the meaning. It is when we have reached the gaping point that the time has come for making a move away from the problem. When we have reached the stage at which we do not know what to do next, we have obviously come to a point at which further study of the problem is only a waste of time. By and by, no doubt, something will turn up that may throw light on the subject and suggest a new line of investigation, but in the meantime we are merely wasting time by gaping.

As a young teacher I had a class in technical drawing for skilled artisans. My pupils used to

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## *Making the Most of One's Mind*

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bring me drawings, that had been given them for their guidance, and get me to explain them. As a rule I found the drawings easy enough to interpret, but on one occasion a huge drawing in Perspective was handed to me as I left the class in the evening, for explanation next day. After supper I laid out the drawing on my table, and in twenty minutes I understood it all except one little three-quarters of a circle at one of the vision points. I could not understand what part it played in the whole scheme: it appeared absolutely useless. But experience in drawings of this kind had taught me that everything has a meaning, and I had read the Rev. John Todd. Accordingly I settled myself down to the siege of this difficulty. Hour after hour passed without bringing any enlightenment, and at length in the early morning, with an internal apology to the Rev. John Todd, I capitulated and started to roll up the sheet. To my surprise the tiny three-quarters of a circle moved. It turned out to be a hair from my moustache. It was then that my suspicions were aroused about the siege system of learning.

Take the case of a passage in a foreign language. At first you move easily enough among the nouns and verbs and adjectives. You know what most of them mean, and you know their ordinary agreements among themselves. You find, however, that there are some words that you do not know. The dictionary is at hand and this difficulty disappears. There may still be some little trouble about a con-

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## *A Guide for All Students*

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cord or an inflection, but in general terms you feel that you know the run of the passage. By and by, however, you observe that there is a combination of words that do not make sense. You look at each individual word, and find that you know them all. The grammatical details seem all in order. Yet there remains a persistent lack of meaning: the passage has no sense. But you are not yet reduced to extremity. You look up in your dictionary all the words, however familiar, that appear in the troublesome part, for experience has shown you that common words have sometimes a special meaning that the dictionary is good enough to disclose. For example, in a French passage, the word *Monsieur* is so commonplace as to rouse no suspicion. It is the last word in the passage that you would look for trouble about. Yet when every other word has established its *bona fides* and you turn this up in hopeless depression, you get the key to the whole passage when the dictionary tells you that this word was formerly used (with a capital—but you had paid no attention to this trifling peculiarity in your search after meaning) to denote the eldest of the King's brothers. But suppose you have no luck in the dictionary, and after all your efforts you remain baffled, and do not know what to do next, you have reached your gaping point. It is time to move on.

You have made a note of your defeat. You are depressed about it, and probably a little angry. All this is to the good. You are in a fighting mood,

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## *Making the Most of One's Mind*

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and determined sooner or later to get the better of the recalcitrant passage. Not infrequently you will find consolation sooner than you expect. It is not uncommon to find on the next page some remark or other that makes quite plain what formerly was unintelligible. When you are dealing with the individual passage you have of course done a good deal of looking before and after, but you have been limited by your ignorance of what is to come in the text. Your making an advance after you have recognized that you have reached your gaping point is in fact only an extension of the process of looking before and after. You are taking a wider view, and sooner or later this wider view will include something that throws light upon the difficulty you have temporarily abandoned.

Since you who read this book have taken your own education in hand you have become an educator, and therefore ought to be interested in the methods of teaching that are presented to teachers at their colleges. Unfortunately most of these methods demand two persons that are separate from one another. They are not usually such as can be applied by a person like yourself combining the two characters of educator and educand. But there are two special methods that have something to teach you, even though you cannot apply them to perfection.

The first of these is named the Socratic Method, after a Greek philosopher who flourished in Athens

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## *A Guide for All Students*

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at the end of the fifth century B. C. You remember that I pointed out already that it is often the teacher's business to make his pupils take trouble. Socrates realized this with special clearness, and spent most of his time trying to get his fellow citizens in Athens to think for themselves. His plan was to get into conversation with some of them, and ask them the meaning of words that they used glibly enough but did not fully understand. His view was that as soon as we clearly understand the terms we use, we are on the direct way to right thinking. Accordingly he made them see by his conversation that they did not know exactly the meaning of the terms they were using, and then set them about finding out the true meaning. He would ask his friends what justice was, or temperance, or truth. They would answer easily enough at first, but he would go on to raise difficulties and could easily show that their meanings were not quite accurate. They would change one meaning for another, and with that too he had some fault to find, and by and by, after many trials, they would discover that they really did not know what the meaning of the word was. When they had reached this stage he would go on asking more and more questions, till at last he led them to find out for themselves the true meaning of the word.

You will thus see that in the Socratic method there are three stages in the experience of the pupil. He begins by being quite confident, though he has

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## *Making the Most of One's Mind*

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no cause to be confident. By and by he becomes confused, and reaches a state of doubt. After that he comes to the third stage, which again is one of confidence, but this time it is a confidence that has a good foundation. A peculiarity that marked the teaching of Socrates was that he always professed that he never really taught anybody anything. All that he did was to enable people to find out things for themselves. Obviously to carry out this method properly it is essential to have a teacher who stands outside of us altogether, and by his questions gets us to think in a particular way. The teacher is supposed to know beforehand all that the pupil is afterwards to learn. For Socrates' affectation of ignorance was only a pose. He knew quite well whither his teaching was tending, but for dramatic effect he proclaimed that he himself did not know, he just asked for information. This is what is called the Socratic irony. It was used because he had to deal with the very intelligent and rather conceited Athenians, and much of his teaching had no higher aim than to make these Athenians realize the possibility that they might be wrong. Now to some extent it is possible for us to use the Socratic method with ourselves. On a famous occasion Cromwell made the appeal to certain persons:

"I beseech you, in the bowels of Christ, think it possible you may be mistaken."

Is it too much to hope that the readers of this

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## *A Guide for All Students*

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book have no need to have such a prayer addressed to them? Assuming then that we do not need to be convinced of our fallibility, we may be able to use the method of asking ourselves questions with the honest purpose of finding out how matters stand in relation to what we are studying. This plan of putting questions to ourselves is only a way of expressing what is always going on in our minds when we are dealing with a problem. Young pupils when set to write a short essay are often quite at a loss what to say. Teachers of junior forms in school sometimes hit upon the plan of telling their pupils to put internal questions to themselves, and then write out the answers. The answers when written down do make up some sort of essay. The arrangement is usually rather bad. But so soon as the youngsters have written down a sheet of answers, they find that they have some material to go upon. They acquire confidence, and by rearranging what they have written down and adding what occurs to them in the process, they are generally able to produce passable work.

You have seen that Socrates did his best to minimize his work as a teacher. But there is another method of teaching that urges the teacher to do still less for the pupil than Socrates did. After all he set the problem, and kept up a running fire of questions. The method known as Heuristic recommends the teacher to leave everything to the pupils after the problem has been clearly stated. The word

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## *Making the Most of One's Mind*

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*heuristic* means literally *finding out*, and the method has been described as the method of causing children to find out things for themselves. In schools this method is applied mainly in science teaching, but it need not be confined to science subjects. What makes it specially interesting to readers of this book is that it throws the whole responsibility of investigation upon the pupil. The method is not a new one, and has been associated with very distinguished names, among them Rousseau and Burke. But in recent years it has been brilliantly advocated by Professor Henry E. Armstrong.<sup>1</sup> He tells me that on one occasion his daughter, then a little girl, had been reading Professor Drummond's book called *The Monkey That Would not Kill*. Among the wonderful escapes of this monkey was one from drowning. He had been cast into the sea with a stone tied round his neck, and thought it was all over with him; but to his surprise he found that the stone was not nearly so heavy in the sea as it was on land, so he was able to get ashore. The little girl asked her father if it was true that a stone was not so heavy in the water as it is outside the water. This is a question that Professor Armstrong regards it as "criminal" to answer, since to do so wastes an excellent opportunity of applying the heuristic method. So his reply was, "Suppose we try to find out." Thereupon began a series of experiments, made by the little girl and recorded by her in an

<sup>1</sup>*The Teaching of Scientific Method*, Chap. xv.



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## *A Guide for All Students*

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exercise book that I am in hopes to see published one day.

Here we have a very definite case in which we know exactly what the problem is. We may not be able to answer the question we have set ourselves, but at any rate we are in no doubt about what the question means. There is nothing more hopeless or more futile than to put in a period of study without knowing exactly what we are aiming at. In such a case we do not *reach* the gaping point, after a series of efforts to solve a problem. We start *at* the gaping point. Some teachers are very punctilious in stating at the beginning of every lesson what the exact aim of the lesson is. Obviously this is not always essential. Not much good is done by announcing at the beginning of a lesson on the Latin verb *volo*, "The purpose of this lesson is to master all the irritating peculiarities of the irregular verb *volo*." It is clear that the heuristic method is applicable only to constructive study. There is nothing to find out in a purely assimilative lesson. But in constructive study it is hardly possible to overestimate the importance of setting before yourself the definite end or purpose you have in view.

Very frequently time is wasted by the student in merely fumbling with a problem. Unless we have a clearly imaged end, there is great danger of merely fiddling about with the elements of a problem. Some students feel that when they are studying they must be *doing* something. In one particular school with

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## *Making the Most of One's Mind*

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which I was acquainted, it was counted an offence "not to have something on your paper." The effect of this was that even if a pupil had no idea how to work a particular problem, he had to write down something—a most pernicious habit. Writing nonsense is necessarily bad for any one. No doubt it is very unpleasant to sit at your desk and gnaw the end of your pen, but you do not improve matters by scribbling down meaningless words. This criticism naturally does not apply so long as you have the least idea of getting at a result by a series of trials. Your attempts may be far from hopeful, but so long as they have a definite object they are justifiable. So soon, however, as you have no definite purpose in what you do, you can no longer be said to study in any real sense.

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## CHAPTER VI

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### READING

WE have seen that reading is one of the three main ways of acquiring knowledge. But when we take up a book, it is not always for the sake of learning something. Often we read for amusement; but even in such reading we cannot fail to pick up much knowledge by the way. Reading a novel is really equivalent to experiencing at second hand. The man who writes such a book must himself know a great many things about the circumstances of the characters he introduces, and as you read his descriptions you cannot but acquire knowledge. The information gathered from a novel may be inaccurate, but this does not alter the fact that we cannot read a novel without some effect upon our stock of knowledge. Nor does the influence of novels stop at mere knowledge. In higher matters, too, we learn from them. The lessons may be for good or for evil, but lessons there are. We have

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## *Making the Most of One's Mind*

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to admit that there is point in Dr. Walter C. Smith's protest about—

“Those new-fangled consciences of ours,  
Formed not by nature but by novels.”

The fact of the matter is that reading cannot help influencing our lives, since in the wider sense intercourse must include reading; after all, reading is a form of intercourse. Indeed the great advantage of literature is that it enables us to keep company with the greatest minds of all time. It is true it has to be admitted that it is a rather lopsided intercourse. We are all made to feel the unresponsiveness of the mere book. In our endeavours to educate ourselves we ought to recognize the necessity of actual human intercourse. This idea is introduced here because it is mainly in connexion with reading that the great distinction is usually drawn between the private student and the student who obtains his education in a school or college. The University of London, for example, has two kinds of students. The internal students are those who belong to some of the institutions connected with the University, who receive instruction there under teachers recognized by the University, and who are not admitted to examination for degrees till they have made the necessary attendances, and are certified by their teachers as having done satisfactory work. The external students, on the other hand, can study where they please; they may have teachers, or they

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## *A Guide for All Students*

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may do the whole of their work privately; all that the University demands is that they shall pass the prescribed examinations and thus show that they have obtained the minimum amount of knowledge necessary to win the degree. External students, whatever their disadvantages, must reach exactly the same standard as the internals, so that from one point of view the winner of an external degree deserves more credit than the winner of an internal.

On the other hand, it is objected that the external student loses something because he does not mix with other students. He may have a private tutor, and thus share the advantages of teaching enjoyed by his internal rivals, but it is maintained that he is at a disadvantage, because he has not had the benefit of intercourse in the college class-rooms, common-rooms, quadrangles, and playing fields. It is no doubt highly desirable that a student should mix with his fellows. What he learns from his books is one thing, what he learns from his teachers is another; but his fellow students have still a third kind of training to give him, and wherever possible he should avail himself of the training that only his fellows can provide.

The external student who has no teacher is apt to over-emphasize the value of reading: he is apt to become bookish. But there are other things to be acquired than the knowledge to be found in books. People get a certain ease and polish from mingling

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## *Making the Most of One's Mind*

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with one another, and besides this they acquire the power of applying what knowledge they possess. Many men who are full of knowledge are very awkward in their everyday life, and are unable to use their knowledge to the best advantage. It is generally found that people who get their knowledge entirely from books, and mix little with their fellows, are at a disadvantage in life. They are called bookworms, and are generally regarded as unpractical persons. They are not at home with other people. They are uncomfortable in society and make other people uncomfortable. The remedy of course is not to give up reading, but to combine reading with that amount of intercourse that enables them to use with effect what they have acquired from books.

Perhaps it is not unnecessary to add that all this warning against being too bookish is rather dangerous reading for many internal students. As a rule these find it easy to resist the temptation to read too much. What they need in most cases is an exhortation to read more. The matter is put before you squarely: it is for you to determine in which direction your danger lies.

In any case you must read a great deal. It is accordingly of the highest importance that you should learn all that there is to be known about it. At the very start we have to consider what may be called the mechanism of reading. It consists essentially in the translation of visual signs into mental states. One person thinks, and to represent his

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## *A Guide for All Students*

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thought causes certain marks to be put on paper or elsewhere. Another person sees these marks and repeats in his mind the processes that went on when the other thought. The first thing to be noticed in this passage from printed characters to thought processes is the time element. We do not sufficiently realize the great differences in the speed with which different people read. Experiments have been made, and it is found that when great numbers of people are tested, they differ so widely that the fastest readers can read six times quicker than the slowest. Naturally we want to know the cause of this enormous difference. No doubt the natural endowment of the individual has a good deal to do with the different rates of speed. Some are naturally quicker than others in all their mental and physical reactions. But we are not to suppose that it is merely a matter of Quick Wits and Hard Wits again. A quick-witted boy in Ascham's sense of the term may not be a particularly quick reader. His strong point is quickness of apprehension. As soon as a point is put before him he understands its bearing. He will learn quicker from a book than would a slower-witted boy, but he does not necessarily read faster.

Many teachers are inclined to say that the slowness of reading that sometimes marks quite quick-witted people results from the bad way in which reading is taught in schools. At school what is technically known as a reading lesson is always a

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## *Making the Most of One's Mind*

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lesson in reading aloud. No doubt at the early stages of learning to read it is necessary to have a certain amount of audible reading in order that the teacher may know that the pupil is really following word by word the passage that is being read. But it does not follow that this method should be kept up all the way through school. For instance, when the tests were made to discover the speed of reading they did not take the form of reading aloud. The investigator's object was not to discover which of the persons tested could gabble off most quickly a given passage. The test was how long each person took to master the contents of a certain number of pages. The person had not to pronounce each word or even to isolate each word in his mind. What he had to do was to elicit the complete sense of the passage.

Many people, even when they are reading silently, pronounce "to themselves" each of the words as it occurs. Some go further and make a half audible sound. Those who sit beside such readers are annoyed by a sort of irregular hissing sound that is kept up all the time. Even in the case of those who make no audible sound it is often possible to detect by the movements of the lips those who pronounce inwardly the words as they read. All such lip movements are an interference with the speed of reading. You should accordingly get some friend to observe you when you are off your guard, and tell you whether you use lip movements as you read.



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## *A Guide for All Students*

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If you find that you do make such movements, it will be worth your while to practise reading without them.

Some authorities are beginning to recommend that reading should be taught merely with a view to making out the sense, and with no attempt at pronouncing the words. Others point out that the main function of reading is to bring out the expression the author put into the words. J. G. Herder, for example, recommended that Homer should be read as if he were singing in the streets. Obviously we have here a quarrel that arises because the disputants are speaking of different things. One set wants the pupils to acquire speed in rapidly getting the meaning of a passage, the other set wants the pupil to acquire the power of bringing out the full content of the passage for the benefit of both himself and others. What we are primarily concerned with at present is the first purpose, the power to dig out of a passage in the shortest possible time all the information it has to give us. By reading in this sense we mean reading so as to acquire knowledge. Enjoyment and expression will have their turn afterwards.

Schools are beginning to recognize the need for training in this practical kind of reading. Pupils must still read aloud, as this gives a certain training of the vocal organs, and besides is preparatory to the artistic use of reading; but they are also getting practice in "silent reading." A passage is pre-

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## *Making the Most of One's Mind*

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scribed, and a certain time allowed. At the end of this time the pupil has to state how far he has read, and then stand an examination on the subject-matter. It is claimed that this method should help in reducing the tendency to lip movements. Those who take this view say that pupils rapidly acquire the power of gathering in the meaning entirely by the eye, and get rid of the handicap of muscular movements or attempts to move. Suppose you find that in reading you are given to lip movements and set about suppressing them, you will probably find that you experience certain tensions in your throat that you can associate with the suppressed attempt to pronounce internally the words that you are reading. It is obviously greatly to your advantage to get rid of these abortive muscular movements. They waste time and direct energy into wrong channels. The best way to get rid of these tensions is to increase the speed of your reading. As this speed increases, you will probably find that you have a tendency to drop the word as the unit of language, and to adopt the phrase as that unit. That is, the mind begins to take in the meaning of the whole passage without pausing on the individual words at all. Very quick readers, indeed, seem to take in the sense not even by phrases but by sentences. In truth, there are those who claim to gulp down meaning by paragraphs.

Your first business will be to find out your present rate of reading, that is your maximum rate of read-

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## *A Guide for All Students*

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ing as a purely mechanical process of absorbing meaning. The question is, how many words you can read per minute and understand the meaning of the passage you are dealing with. Take some ordinary book of no great difficulty. Let it be on history, biography, travels—anything you like, so long as it is not so technical as to demand study rather than reading. Now count the number of words on each of five ordinary full pages. You will find that the number of words is approximately the same on each page, but to make quite sure add your numbers together and divide by five. This will give you the average number of words per page. Then open the book at random and read as strenuously as you can for, say, ten minutes. If possible, get some friend to watch the time for you, so that you may give your whole attention to the reading without being distracted by keeping your eye on the clock. You will, of course, read silently, and you will remember that your purpose is to get the sense of the passage. You are reading for information, not for style or for anything else. When the time is up you will count the number of complete pages that you have read and multiply this number by the average number of words per page. Next, to this total you will add the number of words you have read on the unfinished page: for it is very unlikely that you will chance to be just at the end of a page when the time is up. Having thus obtained the exact number of words you have read in ten minutes, all you have to do is

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## *Making the Most of One's Mind*

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to divide this number by ten, and you get your rate per minute.

It is impossible for me to guess at all accurately what your rate may be, since people differ so very much. It is interesting to know that solemn public speakers utter on an average one hundred words per minute; ordinary speakers one hundred and twenty; quick speakers one hundred and fifty; and very quick speakers sometimes rise to two hundred and even go a trifle beyond that rate. But silent reading should be very much quicker than reading aloud. You should be disappointed if you do not reach three hundred words per minute. Mr. Arnold Bennett, in his little book called *The Truth about an Author*, estimates the rate of an average reviewer's reading as eight words per second, which, of course, gives 480 per minute. The quickest readers that I know can read an ordinary novel in about two hours. Taking this to mean about 100,000 words, we have a rate of reading of about 830 words per minute. It is true that there are readers who claim a still higher rate, and there is a professor in Ireland who states that his rate is seventy words per second, which gives 4,200 per minute, or more than five times the rate of the quickest reader I know. This professor could toss off ordinary 100,000 word novels at the rate of one every twenty-four minutes, and in fact he tells us that in holiday time half a dozen novels a day is his usual allowance.

You are not to be discouraged by these appalling

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## *A Guide for All Students*

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figures. You may not be able to reach the eight hundred rate, but, on the other hand, you must not rest content with the figure you have at present reached as shown by your recent test. Whatever that figure is, it can be considerably increased by a little intelligent practice—unless, indeed, you are in the very exceptional position of having had practice of this kind already. Most people do not pay any attention to their rate of reading, and we all read in such an easy-going way that a little speeding up is always possible. Further, you are not to suppose that any increase in speed necessarily implies a falling off in quality. As a matter of fact, the opposite is nearer the truth. Increase in speed almost necessarily increases the value of the reading. You are aware that in the addition of long columns the quicker we tot them up the more likely are we to be accurate. So the additional concentration necessary to increase our speed produces its result in increased efficiency in the mastering of the subjects about which we read. In the experiments made on the speed of reading it was found that the quickest readers were, on the whole, best able to stand an examination on the subject-matter they had read.

You are not forgetting that all this applies to reading in order to acquire information. There are other kinds of reading in which speed is not only of no consequence as an advantage, but is a positive disadvantage. We may want to savour what we read: to enjoy it as we go along. The style of the

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## *Making the Most of One's Mind*

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book may in itself be excellent and add to our pleasure. Not merely the thing said but the way in which it is said may attract us. No doubt mere style apart from matter is nothing more than a tinkling cymbal, and may be safely neglected. But admirable form joined to worthy matter makes a combination that deserves more than a hurried reading, however thorough that reading may be.

Further, there is a kind of reading that demands not speed but leisure. Its purpose is not to supply material to the reader, but rather to direct him in using material he has at his disposal. It calls upon him to work up his mental content in order to produce certain definite effects. Take a descriptive poem, for example. Here the poet certainly does his best to make pictures rise in the mind of the reader, but he does not supply the material. He rather depends upon the reader having at his disposal a number of ideas that may be manipulated by the words that the poet uses. When you read a fine description in Tennyson or in Scott you are not being informed so much as being stimulated. Your mind has to elaborate the suggestions supplied by the poet. This is why in reading of this kind you often half close the book, and, keeping your finger between the leaves, let your mind wander over the ideas called up by the poet and combine them in the way he desires.

A consideration of this kind of reading brings out clearly the necessity for work on the part of the

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## *A Guide for All Students*

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reader. It is a coöperative process in which the reader must do his share. In reading a purely informative book, the reader must put out a certain amount of effort, but it is sometimes imagined that in reading a pleasant book of poetry the reader is entitled to take things easy. No doubt the kind of work he must do in reading such a book is different from that he must do in dealing with a text-book. But there must be work of some kind. In order that a book of poetry may attain its end, there must be two workers: the poet and the reader. There are, in fact, two kinds of poets, those who write poetry and those who enjoy it when written. We are tempted to call those who write, active poets, and those who read, passive; and there is a certain justification in using these terms. But there is danger of misunderstanding, since the terms would seem to imply that the reader is absolutely passive, instead of being merely passive as compared with the writer. Unless the reader actively responds, the work of the writer is in vain. The poet knows that his reader has in his mind somewhere ideas of heather, and green and purple and gold, and shimmering seas, and twinkling stars, and golden sunshine and silvery moonbeams—and out of this store he calls up just the elements he needs to produce the effect he happens to want at any particular time. If the reader lacks any special kind of experience, the poet makes a failure with that reader every time the verses call for that sort of experience. This is why certain

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## *Making the Most of One's Mind*

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poets are unintelligible to young people, why Browning, for example, has so few readers as compared with Tennyson.

We read for information, and we read for pleasure. But while we are acquiring knowledge and experiencing pleasure we are making certain gains in passing. Since reading is a means of intercourse, by practising it we acquire a command of the chief instrument of intercourse—*words*. Every now and again it becomes fashionable to disparage words, to point out that they are mere breath, empty wind. We are told that men are apt to mistake words for things and to rest content with saying without doing. The philosopher Hobbes is generally quoted: "Words are the counters of wise men, but the money of fools." Now all this is perfectly true, but it only serves as a warning against becoming the slaves of words. The common term of contempt is "mere" words, and here the adjective indicates the essential distinction. So long as words are used without reference to the things they ought to signify, obviously they are impostors and cannot help misleading us. But, on the other hand, without words how would our boasted intelligence fare? We may not go so far as Shelley when he says, speaking of the Deity,

"He gave man speech, and speech created thought,"

but we cannot deny that without speech it would be impossible to carry on intercourse on its present



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## *A Guide for All Students*

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high plane. Learned books have been written discussing whether it is ever possible to think without words. The dispute has not yet been definitely settled, but it is now generally admitted that nothing like continuous thought can be maintained without words or their equivalents.

It is worth your while, then, to take stock of the words at your disposal. Leaving out of account all other languages, it may be interesting to inquire how many words there are in English. In Professor W. W. Skeat's *Etymological Dictionary of the English Language* (1910), we find that there is a total of 14,286 words. Yet when we turn to some of those huge dictionaries referred to in our next chapter we find that they reach, and even exceed, a total of 300,000. Obviously many of the words included in these immense compendia are not really English words. Besides, we may count a word as only one, or we may count it as a great many. In Skeat the word *do* counts for only one of the 14,286: in other dictionaries it may be expanded so as to include all its changes. Thus we may regard as separate words *does*, *doth*, *did*, *done*, *doing*, *did'st*, and even *don't* and *didn't*. It is thus not difficult to see how dictionaries differ in the number of words they recognize. Naturally you want to discover how many words you know, but it is difficult to find out. An ordinary educated Englishman knows practically all the words that are really English, and may fairly claim to know almost all the words that appear

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## *Making the Most of One's Mind*

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in Skeat, and a good many more when we take into account technical terms, anglicized foreign words, and slang. It does not seem unreasonable to credit him with a knowledge of well over twenty thousand words. But if we turn to distinguished writers and find out how many words they use, we get a surprise. Shakespeare is famous for the richness of his vocabulary, and yet we find that those who have made a careful calculation of his words give him only 15,000. Some, it is true, for reasons similar to those we have suggested in the case of dictionaries, give him 17,000. But even at this higher estimate we have the fact that our most distinguished author is credited with a smaller vocabulary than is claimed for the ordinary educated Englishman. Milton, indeed, has a still lower record: his poems do not include more than 8,000 words. Even the English Bible is content with 6,000.

The question naturally arises: if an educated person knows practically all the words in an ordinary English dictionary, how does it come about that the number of words in Shakespeare and others is so small? The answer is that we are all inclined to confound two different kinds of vocabularies—the vocabulary of words that we know, and the vocabulary of words that we use. We all know a much greater number of words than we use. It is sometimes said that the number of words even an educated person habitually uses amounts to only about 4,000. A Scottish schoolmaster has taken the

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## *A Guide for All Students*

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trouble to count up the number of words such a person would find it necessary to know in order to express his ideas, and finds that the minimum is 17,000 words. But this calculation in no way affects the estimate of the number of words habitually used by the educated person. An illiterate peasant is sometimes said to get along with a vocabulary of between 300 and 400 words, though it would be easy to demonstrate that he knows a great many more words than he actually uses. The number of words at the command of a person gives a fair index of his literary status. Among the Chinese, for example, it was required from anyone who aspired to the rank of "imperial historian" that he should be master of at least 9,000 words, and in the Chinese examinations a first or second class depends upon the number of words at the command of the candidate.

We have accordingly to distinguish between the living word and the word as found in the dictionary. Schoolmasters long ago used to prepare lists of words for their pupils to learn, but this was a mistake. We should not go to a dictionary to dig out words so as to use them, but should learn words by meeting them in ordinary speech and in books. We shall speak of the use of dictionaries in our next chapter. In the meantime, we have to note that we all use words in three different connexions, so that we may be said to have each three different vocabularies. We have a speaking vocabulary, a reading vocabulary and a writing vocabulary. In the case

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## *Making the Most of One's Mind*

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of an educated person, the reading vocabulary is much fuller than the speaking vocabulary, and usually a good deal fuller than the writing vocabulary. We know and understand words in our reading that we would never think of using in our ordinary speech, and when it comes to writing we find that we have all a tendency to limit ourselves to the use of certain words, though there are many others that we might use if we set ourselves deliberately to employ all the words we know. If you could have a complete vocabulary prepared of all the words used by, say, Dr. Johnson, and another of the words used by Lord Macaulay, you would find that the two vocabularies differ materially; and even if you take two writers who are contemporaries, you will still find a difference, though not quite so marked. Your own vocabulary, you may rest assured, is different from anybody else's vocabulary, though it will be quite like those of your friends or fellow students who are living the same life and doing the same kind of studies as you. In order that people should understand each other readily, it is essential that their vocabularies should coincide to a great extent, and in particular that their reading vocabularies should be the same. It is not so important that we should all use the same words, as it is that we should all understand the same words.

The best means of enriching your vocabulary is reading. Writing helps, no doubt, particularly in the way of making your knowledge of words more

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## *A Guide for All Students*

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exact. But our first acquaintance with a word should be made by meeting it in active service, not on the retired list as found in the dictionary. In reading your text-books you will often find that what you are really doing is mastering a technical vocabulary. When you are studying the particular terms used in any subject you are, of course, enlarging your vocabulary and doing it deliberately. We acquire clearness of thought in any subject by analysing out the exact meaning of each term. We are, in fact, studying the subject-matter by means of the words that represent it.

But there is need for a much wider range in the use of words, and this may be acquired in the course of what is called general reading. We may read an author solely for his style, in which case we are studying his work in quite as technical a way as if we were reading a text-book. But then, again, we may read an author merely to enjoy his work as art. We read for the sake of the effect he produces on our minds. We may or we may not acquire definite information from this reading, but we do undoubtedly acquire a vocabulary and a certain familiarity with the use of words.

It should not be supposed that our vocabulary is to be recruited entirely from prose reading. In fact, there is nothing more valuable as an aid in forming our prose vocabulary than the intelligent reading of poetry. You will find Shakespeare extremely useful in this matter. It is striking to find that not

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## *Making the Most of One's Mind*

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more than between 500 and 600 of his words are now obsolete. Tennyson is another artist in words, whose works well repay careful study by those who wish to enrich their vocabulary. You are not to suppose that such reading will encourage you to use poetical words in plain prose. The value of reading such writers lies in the sense you acquire of the value of words, their possibilities, the need for variety, and above all, the fact that under certain conditions there is only *one* word that will meet our needs.

When we look at reading from this point of view we have to consider the problem of what is sometimes called "desultory reading." By this term is usually meant reading that is by the way, that has no definite bearing upon our studies, that is, in fact, unsystematic. Many people roundly condemn this form of reading, and maintain that all our reading should be definitely mapped out and arranged according to a settled plan. To this view no serious objection need be raised, but a settled plan ought to make provision for a certain amount of reading of a very general kind. There is room in life for a limited amount of purely random reading, and such reading is all the more necessary in the case of those who are following a severely systematic course of study. What is sometimes called "browsing" among books is a valuable part of a general education, though obviously it must be kept within narrow limits. To be allowed to follow one's own inclination among the books in a well-chosen general library is a means

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## *A Guide for All Students*

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of developing one's individuality. We are not here thinking about the possibility of a student reading objectionable books: that raises quite a different question. What we are concerned with is the need for a certain amount of elasticity in the choice of reading material.

Another point that is worth your attention is the tone to be acquired by reading of a certain class. If you desire to write in a particular way, you will find it very helpful to read books exemplifying that way. If you wish to write with an elevated tone you should saturate your mind with the Bible or with such writers as Burke. If you wish to cultivate an easy, light tone, such writers as Goldsmith or Addison will give you what you want. You will often find, indeed, that it is wise to read a writer whom you do not greatly admire, in order to get rid of certain peculiarities of your own style.

Having now considered the different kinds of reading, we are in a position to look into some of those practical problems that face the student. Foremost among these is the question of *skipping*. You are not to make the mistake of treating this as a purely moral matter. There are cases where skipping is contemptible; there are others in which to do anything else is foolish. The important thing is not the number of pages you cover, but what you get out of them. Your reading must be dominated by purpose. You go to a book for a definite purpose; unless you make the book serve that purpose you

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## *Making the Most of One's Mind*

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have not used it wisely. Not to skip may be a very immoral proceeding. You go to a book to find examples of certain grammatical constructions: it is altogether wrong to read doggedly through it. You wish to form an idea of a man's character from his biography. A great deal of the matter in the book we take up may be of no value to us whatever and ought to be ruthlessly skipped, if we hope to look our conscience in the face. The mere desire to complete a book is not necessarily a moral desire. The spirit of the collector, the lust for completeness, rather than a good going conscience accounts for the unwillingness of many people to skip. There is no breach of contract with a book if we drop it when we find that, on closer inspection, it falls short of what we expected.

Where it is wrong to skip is in the book that we find difficult, and therefore unattractive. It is the old question of thoroughness over again. If the difficult or dull part is essential to our purpose, skipping is out of the question. If I am trying to form a just estimate of a man's character from an *autobiography*, I may feel intensely bored with certain chapters, and may honestly, and even justly, regard them as in themselves worthless trash, but for my present purpose it is imperative that I get all the materials for forming a true judgment of the man's character. With regard to difficulty it is worth noting that we are not justified in skipping a chapter on the plea that we do not understand it,



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## *A Guide for All Students*

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for, obviously, we cannot be sure that we do not understand it until we have finished it. Whether we should read it a second time or not depends upon our attitude towards the whole book. It may be quite a desirable thing to neglect the difficult chapter till we have read all the rest of the book twice.

Often all that we want from a book is its essential message for us. It is often quite easy to get the heart out of a book without reading more than a quarter of it. Many German books, for example, seem to be written on the principle of telling in the first three-quarters of the book all that other people have said on the subject, leaving the remaining quarter for the author's own contribution. In cases of this kind it is folly for an experienced reader to trouble with the preliminary part; though, to be sure, if the reader is a beginner in the subject the whole book must be read. Everything depends on the needs of the individual reader.

The matter of marking books as you read them calls for attention. Obviously this can interest us only in connexion with books that belong to us. It is quite a wise plan to mark text-books. Marks at the side, underlinings, numbering of separate points in paragraphs, backward and forward references—all are valuable in a book of this kind, and increase the value of the book for the person who has made the marks.

With regard to ordinary books in literature, history, art, criticism, it is probable that we should

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## *Making the Most of One's Mind*

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be very moderate in our use of marks. Some writers recommend a more or less technical series of marks to indicate various criticisms of the text. A couple of lines at the margin, for example: "Signifies that this paragraph contains the main or one of the main propositions to be proved or illustrated in this chapter: the staple or one of the staples on which the chain hangs." Another sign conveys the meaning: "This sentiment is true and will bear expanding, and will open a field indefinite in extent"; while another serves to inform us that: "This, if carried out, would not stand the test of experience, and is therefore, incorrect." Other signs indicate good taste and bad taste, irrelevancy and repetition, accuracy and error, good arrangement and bad.

All this might be useful if your purpose were to give a very thorough review of the book for the benefit of somebody else—though my experience of reviewers does not lead me to gather that they have such a starkly pedantic scheme—but you will find it highly desirable to adopt a much simpler plan. You must read critically, of course, but your aim should be more to profit by what your author says than to indicate to him where he has gone wrong. A single line at the side to indicate an important passage, a double line for a more important passage, and a triple line—to be used very rarely indeed—for passages of vital moment, a ? here and there when you are not sure about the facts or opinions, or where you wish to make further inquiries, a

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## *A Guide for All Students*

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reference to some other part of the book where the same matter is dealt with, an indication of some other book or passage bearing on the same subject—these you will probably find sufficient for your purpose. It is a fundamental principle that the marks of importance mean importance to you, and not to people at large; further, that they mean importance to you in connexion with the particular purpose you have before you in reading the book. Thus the marks you put on a book give it an individuality and make it of special value to you. When you want to refer to a passage in a book you have so marked, you have no difficulty in locating it by merely turning over the pages. For the only passages that you have remembered well enough to wish to recall are those that struck you most in your reading, and those will naturally have your “important” mark. You will, of course, realize that if you use marks very freely, you must pay for this by the increased difficulty of locating a passage afterwards. Moderation in marking is highly to be commended.

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## CHAPTER VII

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### TEXT-BOOKS AND BOOKS OF REFERENCE

ONE of my dictionaries tells me that a text-book is "a book containing the leading principles of a science." Another goes into more detail and explains that a text-book is "a volume, as of some classical author, on which a teacher lectures or comments; hence any manual of instruction; a school book." You will note that we have here two fundamentally different ideas of what a text-book is, and the difference arises from the relation assumed between the book and the teacher. The first definition does not mention the teacher at all; the second puts him in the forefront.

The connexion between the teacher and the text-book is an ancient one, and carries us back to very early times when there were few books indeed. There were, in fact, more teachers than books, and the business of the teachers was to acquire as much knowledge as they could from books and from intercourse with men, and then place this knowledge at

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## *A Guide for All Students*

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the disposal of their pupils. Very often their teaching took the form of reading and explaining the few books that were at that time available. In the old schools and universities the teachers and professors used to lecture on the writings of their predecessors. Thus the writings of men like Plato and Aristotle were read, explained and criticized in such a way as to bring out their full meaning. They were treated, in fact, pretty much as a modern clergyman deals with a text from the Scriptures. The text-book was thus the basis of the lecture, it was the authority, and the teacher took the subordinate position of a mere expounder of what another man had written. Often, no doubt, the comments of the teacher were of more value than the text on which he commented. This became increasingly common in connexion with subjects of a scientific character. Fresh discoveries were made, and mistakes were found in the text. These mistakes the teacher, of course, pointed out, in order that his hearers should know the truth. But such corrections had to be most carefully made, for those old people were very jealous for the honour of their established authorities. Aristotle, for example, became for centuries the recognized authority in a great many subjects. What he said was regarded as final on any subject on which he had written, and hearers would not listen to anything opposed to him. Commentators, if they wanted to make any corrections, had to endeavour to show that the new things they wished to bring forward

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## *Making the Most of One's Mind*

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were really implied in Aristotle, were, in fact, what Aristotle meant all the time, though it needed clever people like the lecturers to make this evident.

As the excessive authority of the old writers waned, it was permitted to the lecturers to set forth their own discoveries, and gradually it became the custom for men who had acquired great knowledge or made important discoveries to gather together to exchange their knowledge among themselves, and to communicate to ordinary students as much of their learning as the students were ready to take in. Thus we had the gradual growth of the universities. At first the students merely listened to the professors and wrote down as much of what they heard as enabled them to store it up and carry it away with them from the university. With this part of the professors' work we shall deal more fully in our next chapter. Here we are interested in the change that took place on the invention of printing and the multiplication of books. When a learned man could put all his knowledge into the form of a book there was no longer an absolute necessity for people to assemble at certain centres so as to gather the knowledge that fell from the lips of the professors. The book began to take the place of the teacher. This is what underlies Carlyle's saying that the modern university is a library.

So far as the communication of knowledge is concerned we may accept Carlyle's statement, though, as we have seen, there are other influences at work

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## *A Guide for All Students*

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in a university than those connected with the acquiring of information. In the meantime we are interested in the nature of the text-book that has been evolved by the diffusion of knowledge and the multiplication of printed matter. Not every text-book is meant to take the place of the teacher. At the present moment there are more text-books being printed for school use than ever before in the history of the world. But the way in which they are used is quite different from that of the old times. No doubt, even yet, in dealing with the teaching of foreign languages we have the pupils provided with a standard book in a certain language, which book is used in the good old-fashioned way as a "text" on which pupil and teacher alike work as the basis of their studies. Further, it has to be admitted that in a less legitimate way teachers of poor attainments and low ideals of their profession supply their pupils with text-books in various subjects, and use these text-books as the authority. Such teachers depend upon the books for the information the pupils have to acquire. The text-book is the master, and the teacher the mere expounder of what is to be found there.

But the really well-informed and capable teacher uses the text-book in a totally different way. For him it is an aid, and not a master. It supplies the broad outlines of the subject and fills in the necessary details. It saves the teacher from the mechanical labour of writing out lists and putting on the black-board long tables of facts that are important in them-

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## *Making the Most of One's Mind*

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selves, but that are common property and demand no special ability either to discover or to understand. The teacher's business is to guide his pupils in their approach to a new subject, to warn them of pitfalls, and to present matters in such a way as to avoid unnecessary expenditure of time. He must, above everything, see that the subject is treated in such a way as to meet the special needs of the pupils here and now before him. He must mediate between the text-book and his pupils. That is what a teacher is for.

Instead of taking the book and talking round it, the real teacher deals with the subject itself and falls back upon the book to supply illustrative matter, and to give in a permanent form isolated facts that otherwise would be forgotten if they were presented only once to the pupil in the course of a lesson, however excellently that lesson had been given. In the hands of a good teacher the main function of the text-book is to secure careful preparation and steady revision. The poorest teacher of all is the one who does nothing more than prescribe a certain portion of the text-book to be prepared for each day's lesson and in the class hour find out by questions whether the pupils have learned the portion set for their study. If this is the only use made of text-books the value of the teacher does not appear to be very great. All that he does is to act as a sort of external conscience and see that the pupils do their work. A student with a good working con-



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## *A Guide for All Students*

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science of his own could do quite well without a teacher of this kind. In fact, the private student does use the text-book just in this way. He treats it as a book containing the leading principles of his subject, and sets himself to acquire those principles from the book by his own efforts.

With regard to text-books, students fall naturally into two classes. Some prefer to have all their instruction at the hands of teachers; they like to be told things, to have matters presented to them by the human voice. Others like to have facts set down before them in the cold black and white of print, and to have time to deal with them at their own pace and in their own way. The chances are that you who read this book belong to the second class. The very fact that you are taking the trouble to read these pages shows that you want to take the matter of education into your own hands and set about it in your own way. But you are not to suppose that the presence of a teacher is a disadvantage. It is quite the opposite. The wise student will take every opportunity to come under the influence of good teachers, but he will at the same time make all his arrangements to get the greatest benefit from both teacher and text-book. He will make each supplement the other. In the last resort, if a teacher is unavailable, the really earnest student will be able to make shift with the text-book alone.

So we come now to a consideration of the nature of the text-book itself. This varies according to the

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## *Making the Most of One's Mind*

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account it takes of the personality of the person who is to use it. Some text-books do not consider the student at all. The only concern of the author is to make the best possible presentation of his subject. Above everything he desires to give a logically arranged statement of the important facts in their true relation to each other. The subject is everything. Such books are veritable "texts." They almost demand a teacher: the matter is stated in such a bald way that the ordinary student has little chance of mastering the subject, while the somewhat easy-going student is supplied with no moral incentive to effort. The teacher can supply to the ordinary student explanations and expansions, and can apply stimulus to the indifferent one. The private student finds such books very difficult. Of course, if he has the intelligence and the grit to face and conquer them, he has a corresponding reward; for there is no triumph like that of mastering a difficult subject by sheer force of intelligent application.

Other text-books, particularly of recent years, do take account of the nature of the pupil. They recognize the distinction between presenting the matter from the point of view of the person who knows it all already and from the point of view of the person who is making his first acquaintance with the subject. The old Latin Grammars, for example began with the declensions and worked their way mercilessly through the whole of the Accidence and Syntax without taking the least account of how it

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## *A Guide for All Students*

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all struck the pupil. The rules were stated with great exactness and numberless exceptions were duly noted. Everything was as complete as the scholar-author could make it. The newer kind of Latin Grammar includes explanations and exercises. The pupil is let into the secrets of things: he is told what it is all about. Many of the newer text-books frankly adopt the pupil's standpoint, and address him in the second person. Others are a little afraid of going so far, and content themselves with referring in the third person to the student, saying that he will find this or that the better way to go about his work. Problems are often given, along with certain hints that help the student towards a solution. It is clear that in all this we are trenching upon the teacher's province. The text-book is becoming, to some extent, a teacher on its own account. There are now, in fact, all degrees of the personal appeal in text-books, from the sternly logical kind in which personality of all sorts is rigidly excluded to the kindly, confidential style of the "self-educator" text-books, that frankly try to take the place of the teacher altogether. The fewer the opportunities the student has of obtaining the services of capable teachers, the more he is inclined to fall back upon the text-books that make the personal appeal. But the private student should not confine himself to books of this class. He ought always to have on hand one or two text-books of the severely logical type, and make the best he can of them.

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## *Making the Most of One's Mind*

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In using the more rigid kind of text-book the student who has no teacher should not make the mistake of thinking that he must follow the exact order of the book in dealing with the different parts of the subject-matter. He must approach the book as a source of information, but he is entitled to get that information in any order that he finds most convenient. He will first make an inspection of the book as a whole. Too frequently the student takes up a new text-book and merely sits down and starts at the beginning with the intention of going right on. But this is a bad way of beginning with some books. You should always make up your mind what you expect to get from anything you propose to read. This is essential in order that you may bring to your reading a mind ready to profit by what is presented to you. In books of the kind we are at present considering the preface usually gives little help. It generally deals with matters that interest the author rather than help the reader. The list of contents, however, is usually more enlightening and provides a sort of bill of fare from which you may choose what is most likely to prove of use to you. The index, too, must not be overlooked. It often supplies a clue to the place where is to be found the particular kind of information you desire. Your plan, of course, is to begin such a book as this at whatever point presents the closest connexion with your present knowledge. Books of this kind are to be read for the information they supply, so your

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## *A Guide for All Students*

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conscience may be easy in the matter of skipping. You may quite wisely make up your mind that you are going to master the book as a whole, but this resolution in no way militates against the plan of dealing with the book by instalments selected at your discretion. In reading it is as true as in warfare that we should divide and conquer.

Before leaving the question of text-books it is worth while combating a popular view that a text-book has served its turn when it has given up its information to the reader. Some students, in fact, have the detestable habit of selling all their old text-books as soon as they have served their turn. The arguments in favour of this plan are plausible enough. Such books are valuable only for the information they impart; when that information is mastered they are of no more value to us than is the *débris* that we call a sucked-orange. Besides, progress, especially in the sciences, is so rapid that an old text-book becomes antiquated almost as soon as we have done with it. This last consideration is the only one that counts. All the rest are based on ignorance of the special value to us of any text-book that we have thoroughly studied. We have a greater familiarity with that text-book than with any other on the subject. We know our way about in it. We are able, with the minimum expenditure of time, to get out of it any information we want. We have a special interest in the book. It represents, in fact, a certain amount of paid-up intellectual capital that

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## *Making the Most of One's Mind*

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is squandered if we part from that particular book. If the subject dealt with in the text-book is one in which we are likely to maintain an interest in after life, there could be no better way of keeping up to date in it than by making from time to time the various corrections in our old text-book that advances in the subject make necessary. There is the further advantage in retaining our old text-books that they supply in the most effective way a record of our intellectual experience. No one who has not tried it can realize the efficiency of an old text-book in reviving in the mind the intellectual experiences that marked the original study of the subject.

In your general pursuit of knowledge you cannot confine yourself to text-books. In these, more or less systematic information is presented in certain definite subjects, but there are subjects that you are not studying systematically and that yet come your way in general reading and in connexion with composition or ordinary intercourse, and it becomes essential to know how to get answers to the questions that are constantly arising out of our ignorance. Now there is a group of books that resemble the severer kind of text-books in that they exclude the personal element and depend for their value on their strictly logical arrangement. These are known by the general name of "books of reference," and an important part of our education consists in acquiring familiarity with these means of meeting the sudden

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## *A Guide for All Students*

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demands for information that are so frequent in actual life. The characteristic of books of reference is that they are so arranged as to provide, with the minimum expenditure of time, the precise information we may at any moment require. A text-book is to be used steadily and mastered as a whole. A book of reference is to be used only to the extent that it happens to be required.

The dictionary is probably the most characteristic book of reference, and the importance of the distinction between a text-book and a book of reference may be well illustrated by a misuse that is sometimes made of the dictionary as a source book. We naturally and properly appeal to the dictionary for the meanings of words that have troubled us in our reading or speaking, but we should not go to it to discover new words to use. We have seen that old-fashioned schoolmasters used to make up little dictionaries of words in order that their pupils might have their vocabularies enlarged. But the proper way to enlarge our vocabulary is to have intercourse with others and to read widely. In this way we get the meaning of words from seeing and hearing them used, and when we are in doubt about a word we go to the dictionary. It is true that at school exercises are often set for the very purpose of giving practice in the use of words, and as an exercise this is not open to objection. But there is sometimes a danger of carrying dictionary work too far. There is, for example, a book, excellent in itself but liable to

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## *Making the Most of One's Mind*

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abuse, that seeks to combine the dictionary function with the word-supplying function. It is known as Roget's *Thesaurus of English Words and Phrases, Classified and Arranged so as to facilitate the expression of Ideas and assist in Literary Composition*. The very word *Thesaurus*, meaning treasure-house, reminds us of the old-fashioned books of the same sort. The first half of the book is arranged in such a way that the words are classified under six categories or headings. We have words dealing with each of the following six subjects, (1) Abstract Relations, (2) Space, (3) the Material World, (4) Intellect, (5) Volition, (6) Sentient and Moral Powers. The idea seems to be that if we are writing on any of these subjects we might naturally consult the vocabularies in order to get the proper words for our purpose. On the other hand, the second half of the book is made up of a list of words alphabetically arranged and with references to the place where the word occurs in the first half, so that if a reader has a difficulty with a word he may turn it up under its proper category and see it explained and illustrated by quotations. Though the book may be quite wisely studied as a text-book, its best use is certainly as a book of reference.

The danger of going to a dictionary to get a word to use in a composition is well illustrated in the misuse of the English side of the dictionary of a foreign language. In learning languages other than our own we have to use the dictionary a great deal,



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## *A Guide for All Students*

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but we ought to use almost exclusively the part of the dictionary that gives the foreign words followed by their English equivalents. Thus, when we are studying Latin, we have two parts to our dictionary: one is called Latin-English, the other English-Latin. Now the student should confine himself almost entirely to the Latin-English part. My Latin professor at the university used to say that he would gladly make a bonfire of all the English-Latin dictionaries in the world. His animosity was aroused because students, in translating English into Latin prose, would go to the English-Latin part and find there words that they had never seen before and use them in a wrong sense. The careless schoolboy looks up a word in his English-Latin dictionary and finds perhaps a list of half a dozen equivalents. If he is a simple soul he selects the first and uses it. If he is more sophisticated he selects one about the end of the list, to show that he has really looked at them all. It is a mere chance if he hits upon a reasonable word to fit into his context. The danger is greatly enhanced if the dictionary is a mere list of words, a vocabulary. With a dictionary of this kind a boy will unblushingly present *pater genus* as his version of "kind father." It is true that *genus* means *kind*, but kind in the sense of sort or species. Here the word *genus* is a substantive or noun and obviously is not to be used as an adjective, and a student who had exercised the least care would have been warned off such a mistake by finding after

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## *Making the Most of One's Mind*

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the word the contraction *subs*, or at anyrate the letter *n*.

Sometimes, to be sure, there is a list of nouns that look equally well to the student, and he has to take his choice among them. Thus, in French, a boy may show up the sentence: "M. Rondeau était la meilleure allumette de la ville." When he looked up the word *match*, he had his choice of *égal*, *pareil*, *parti*, *mariage*, *alliance*, *allumette*, and *mèche*. Of these the only one he was sure could not be right was *mariage*, since it would be absurd to say that a man was a marriage. He did not like to take the very last word offered, so compromised on *allumette*.

The same thing naturally applies to adjectives. The word chosen may be an adjective right enough and yet not the right adjective. When a student shows up "une opinion indigente" as French for "a poor opinion," he is using a wrong adjective. In this particular case, the boy explained that he knew the ordinary French word for *poor* all right, but *pauvre* seemed to him too easy and common a word; so he had looked up the English part of his dictionary and thus come to disaster. If this boy had had any feeling for words, he would have guessed from its English equivalent that the adjective *indigent* had to do with the particular kind of poverty that can be expressed in terms of lack of money, and therefore has nothing to do with a matter of opinion. The boy was right enough, as it happens,

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## *A Guide for All Students*

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in thinking that *pauvre* was too familiar a word for this connexion, and with his limited knowledge of French he could not be expected to be aware that the appropriate word is *triste*. Still, if he had had the sense and the opportunity of turning up a bigger dictionary, one that gives illustrative instances, it is almost certain that he would have found an example of *triste* used in this special sense.

Without going the length, then, of burning all the English-Foreign dictionaries, we may lay down the principle that these should be used sparingly. In particular, small dictionaries of this kind are to be avoided. These are little more than lists of words, with no indication of special connexions in which they should be used. Most of the bigger dictionaries give such suggestions about the nature of the words as prevent the careful student from making a serious misuse of a term. We are always entitled to use the English side of a dictionary when we remember vaguely the sort of word we want and feel sure that we would recognize it when we see it. For example, we may know definitely that there is a French equivalent for *donkey*, and that it is different from the ordinary word *âne*, but we forget what that equivalent is. When we turn up the dictionary under the word *donkey* and find the word *baudet*, we know that that is exactly what we want. We recognize the word, though we were unable to recall it. Speaking generally, indeed, the English part of a foreign dictionary should always

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## *Making the Most of One's Mind*

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be used under the condition that it is in every case to be edited by the experience of the student. It is a capital rule never to use a word that we find in a dictionary unless we have some memory of having seen that word actually used in the language in question. The student, in fact, is entitled to any word a book can offer him, if only his previous knowledge is sufficient to enable him to make an intelligent use of that word.

You will note that stress has been laid on the size of a dictionary, and this has been done deliberately, for size is an important factor in determining the use to be made of a dictionary, whether foreign or English. Even in the case of the purely English dictionary we have various sizes, with their corresponding uses. First of all there is the little dictionary that lies on the desk of the person who is shaky in spelling. Where meanings of words come into consideration, a somewhat larger dictionary is required. A further demand for the derivation of words and their history makes still bigger books necessary. Then we come to dictionaries that give all manner of illustrative quotations under each word. To these there is almost no limit of size. *The Century Dictionary* (six volumes), *The Standard Dictionary* (two huge volumes), *The Imperial Dictionary* (four volumes), *The Encyclopædic Dictionary* (seven volumes and a supplementary volume) are all excellent. They combine the good qualities of a dictionary with those of an effective small

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## *A Guide for All Students*

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encyclopædia. In this respect they differ from the monumental work edited by Sir James A. H. Murray, called *A New English Dictionary on Historical Principles*, or, for short, *The Oxford Dictionary*. This is often spoken of as the greatest dictionary that has ever been published. It is purely literary, omits the encyclopædic element, and specializes on the use of words as words. It is specially valuable through its copious illustrations of words as found in standard authors and in ordinary speech.

So far we have been dealing with ordinary dictionaries, in which the main interest is in words, but the convenience of the alphabetical arrangement of information is so great that it has been applied in other directions. At the end of any of the bigger dictionaries you will find lists of various kinds all giving information that it is hardly the business of the ordinary dictionary-maker to provide. Thus, turning to the end of the second volume of my copy of *Webster's International Dictionary of the English Language*, I find the following additional dictionaries: (1) an Explanatory and Pronouncing Dictionary of the Names of Fictitious Persons, Places, etc.; (2) a Pronouncing Gazetteer or Geographical Dictionary of the World; (3) a Pronouncing Biographical Dictionary; (4) a Pronouncing Vocabulary of Greek and Latin Proper Names; (5) a Pronouncing Vocabulary of Common English Christian Names; (6) a Dictionary of Quotations,

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## *Making the Most of One's Mind*

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Words, Phrases, Proverbs and Colloquial Expressions from the Greek, the Latin, and Modern Foreign Languages; (7) an Alphabetical Catalogue of Abbreviations and Contractions used in Writing and Printing; (8) a List of the Arbitrary Signs used in Writing and Printing.

It is difficult to realize what a storehouse of information is here provided. With one of those big dictionaries at hand, with its supplementary lists, it is astonishing how independent the private student may be. These supplementary lists are often quite interesting in themselves, and an idle half-hour might be worse spent than in glancing over them. But this is not the use for which they are intended. Just as the ordinary dictionary is not meant to supply words to be used, so these special dictionaries are not meant to give information as a text-book would, but to supply at a moment's notice a piece of information that is necessary to enable us to understand something that we are reading or studying. Some authors are very "allusive," by which it is meant that they are much given to referring without explanation to things found in other books and languages. A well-educated and widely-read man can usually follow all the references made by such allusive writers, but a young student cannot be expected to catch on to all the author suggests. It is in trouble of this kind that these supplementary dictionaries are a very present help. Frequently you will have to spend a little more time over a

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## *A Guide for All Students*

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matter than you need have had you but had fuller information to start with. For example, a student came across a reference to a person called Prester John. He looked up the Biographical Dictionary first, under *Prester* and then under *John*, without success. Then he turned to the Dictionary of Fictitious Persons, where he found this was "the name given in the Middle Ages to a supposed Christian sovereign and priest of the interior of Asia, whose dominions were variously placed." In this case the student was somewhat to blame for the time he wasted in looking up the Biographical Dictionary first, for the passage that had led him to make inquiries ran, "as mythical as Prester John." From this he ought at once to have inferred that he was dealing with a person to be found among the fiction group. A little preliminary reflection often saves a deal of unnecessary investigation.

Separate dictionaries are also published of Biographies, Fictitious Persons, Quotations and what not. There is one in particular that is invaluable to all readers who are anxious to have light thrown upon obscure references in their reading. It is called *A Dictionary of Phrase and Fable*<sup>1</sup>: is the work of Dr. E. C. Brewer; and contains all sorts of curious information, arranged in a very convenient way.

Certain dictionaries are not very much to be recommended, since they are prepared to meet a need that ought not to arise. A Rhyming Dictionary, for

<sup>1</sup>Cassell: published price, 10s. 6d.

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## *Making the Most of One's Mind*

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example, supplies lists of words that rhyme with any given words. If you want a word to rhyme with *larch*, you turn up this dictionary, where you find the words arranged alphabetically, but placed according to their last letter instead of the first. Thus for *larch* we turn to the *h*'s, then run down till we come to the *ch*'s, the *rch*'s, and finally reach the *arch*'s. In one such dictionary<sup>1</sup> we find the following list: *arch*, *search*, *cimeliarch*, *chiliarch*, *mysteriarch*, *patriarch*, *heresiarch*, *larch*, *March*, *anarch*, *monarch*, *parch*, *hierarch*, *tetrarch*, *starch*. Obviously not all these words rhyme with *larch*, though they all end in the same four letters. The reader is supposed to use his intelligence in selecting what meets his needs. Other rhyming dictionaries confine themselves to words that do rhyme. Thus in one dictionary<sup>2</sup> is found the following list: *arch*, *march*, *parch*, *starch*, and the reader has the assurance that he has here all the possible English rhymes to *larch*.

But as a matter of fact, many people object to this hunting for rhymes. They maintain that unless the appropriate words suggest themselves there is little chance of anything really artistic resulting. The objection is the same as that we made to the use of the dictionary as a mere verbal mine from which to dig out words to express our meaning. I have heard this word-digging defended by a reference to what Kipling says of his early work: "I dredged the dic-

<sup>1</sup>*Walker's Rhyming Dictionary* (Routledge).

<sup>2</sup>*The Rhymer's Lexicon* (Routledge).



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## *A Guide for All Students*

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tionary for adjectives." But when you consider the matter, you will see that he was not seeking unknown adjectives by running his eye up and down the columns of the dictionary. What he did was to use the dictionary as a reviver of words with which he was familiar. In the same way a rhyming dictionary may be to some extent justified as a means of presenting a complete list of the possibilities, the whole merit of the writer lying in the skill with which he chooses the appropriate word.

A dictionary of synonyms is open to somewhat the same objection as the rhyming dictionary, though perhaps in a less degree; for it is conceivable that a student may want to look up synonyms in order to discriminate carefully among them, and not merely to find a word to alternate with another. Remember that in the last resort there are really no such things as synonyms. However alike two words may appear to be in meaning, there is always just that shade of difference between them that makes one right and the other wrong in any particular case. It is this delicate perception of the only word that really suits the particular occasion that marks the artist in words.

There is another kind of dictionary that is of great use to all who have much to do with reading and writing. This is called a concordance, and consists of a collection of the more striking passages in any author arranged under the characteristic words to be found in these passages. This enables us to

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## *Making the Most of One's Mind*

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find with the minimum of trouble exactly where a certain passage occurs. If we wish, for example, to find where the passage "The wages of sin is death" occurs in the Bible, we take a concordance of the Bible and turn up any one of the important words—*wages*, *sin*, *death*—and we find the passage quoted, with the reference *Romans* 6. 23. Now though it is true that the passage occurs in the concordance under all three words, it is not a matter of indifference which of them you choose as your guide. The principle to follow is always to select the word that is least common. Of the three words, *wages*, *sin*, *death*, the first is to be preferred, as it does not occur so frequently in the Bible as the other two. In point of fact, if you care to look up a Bible concordance, you will find that there are not more than about fourteen references under *wages*, while there are two or three columns of references to *sin*, and about as many to *death*. There are concordances to several of our great writers. Mrs. Cowden Clarke has an excellent *Complete Concordance to Shakespeare*, for example, and though there is not yet a complete concordance to Dickens, there is an excellent *Dickens' Dictionary*, by Gilbert A. Pierce, which provides a "Key to the Characters and Principal Incidents in the Tales of Charles Dickens."

You will have noticed that the use of the word "dictionary" is rather loose. Referring to Webster, I find that *dictionary* means, in the first place, "a

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## *A Guide for All Students*

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book containing the words of a language arranged alphabetically, with explanations of their meanings; a lexicon; a vocabulary; a word-book"; and in a secondary way, "a book containing the words belonging to any system or province of knowledge; as a *dictionary* of medicine or of botany; a biographical *dictionary*." The point common to the principal and the derived meaning of the word *dictionary* is clearly that it deals with "the words," and with these in an alphabetical order. Its business is regarded as complete when it has given the meanings of the words involved, whether in connexion with Medicine, Botany, or Charles Dickens. The subject-matter is not the important thing, but the words and their special application. Yet it is clear that we often go to a dictionary for information that does not stop at words. In some of our bigger dictionaries, for example, we get a fairly full account of certain *things*, with drawings and descriptions that certainly carry us far beyond the range of mere words. And, after all, this tendency of dictionaries to become storehouses of general knowledge is only a recurrence to what was a former use of the word dictionary.

When books were rare and knowledge limited, there was not the same dividing up of the realm of knowledge into separate departments that is common to-day. People did not then talk about "subjects" as we do. With the limited amount of knowledge then available it was not impudent, as

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## *Making the Most of One's Mind*

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it would be now, for a man to "take all knowledge to his province." Accordingly it was not unusual for a man to write a treatise in which he hoped to include all human knowledge. Even as late as the sixteenth century it was still possible for a man to publish an encyclopædia that was supposed to exhaust human knowledge. Early in the seventeenth century we have an encyclopædia published by Johann Heinrich Alsted. This professed to give a complete account of human knowledge, but was superseded in 1673 by an encyclopædia published by a Frenchman called Louis Moreri. The great improvement introduced by Moreri was that he did not attempt to arrange his matter like Alsted on what was called a scientific basis. He did not classify his information according to the connexion of one subject with another. He adopted the alphabetic system, so that while his readers did not have, as in Alsted's work, a consecutive presentation of knowledge, they had the great advantage of being able to turn at a moment's notice to the particular bit of knowledge that they wanted. It is obvious that in introducing this change Moreri acknowledged the predominance of words, that his work was, in fact, a dictionary rather than a mere encyclopædia. Indeed, he marked his change in attitude by the adoption of a different form of title. He dropped Alsted's word *Encyclopædia* and called his work *The Great Historical Dictionary*. Since his time the alphabetic arrangement has been found so satisfac-

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## *A Guide for All Students*

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tory that it has been retained in all the important encyclopædias that have succeeded his

You will see, then, that our bigger dictionaries are becoming practically small encyclopædias, the main difference being that the dictionaries still retain their loyalty to words to the extent of including every word, as a word, giving its use and derivation and other etymological particulars, while the encyclopædias content themselves with giving only those words that represent matters that require explanation. The dictionaries still retain such words as *do*, *between*, *often*, *and*, *hullo*, *which*, *pleasant*, while the encyclopædia confines itself mainly to nouns or such other parts of speech as have acquired a substantive meaning by their connexion with other matters. The dictionary is, therefore, still the proper court of appeal in matters of words, while the encyclopædia is a storehouse of easily accessible information about things or persons.

Encyclopædias vary considerably in size, and with the size we should vary our use of them. We should use a little encyclopædia in quite a different way from a big one. The biggest encyclopædia ever published is known as the *Encyclopædia Britannica*. It is a very old book, the last volume of the first edition being published in 1771. It has, of course, been revised from time to time, and the current edition has been brought up to date and appears in thirty-two large volumes. The smaller encyclopædias may be represented by *Chambers' Encyclopædia* in

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## *Making the Most of One's Mind*

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ten volumes, and *Harmsworth's Encyclopædia* in the same number of volumes of a somewhat smaller size. For many purposes the student will find the smaller encyclopædias of more use than the larger. To begin with, they have the matter more condensed. As a rule you do not want a complete account of any subject. You want merely that bit of the subject that meets your immediate needs. When you turn up a subject in the *Britannica* you are frequently met by a treatise that would make quite a respectable volume if published by itself, and the chances are that if you are looking for some particular fact you will find great difficulty in separating it out from the mass of other material that the encyclopædia so generously provides. These long articles are often of the greatest value in themselves. They are really standard treatises on their subjects by specialists of established reputation, and for those who mean to study a subject they afford excellent material. But regarding an encyclopædia as largely a sort of first-aid supply of information, you will probably find it to your advantage to keep to the smaller kinds.

To obviate the difficulty of finding what you want in the *Britannica*, its publishers have added an index, which forms a volume by itself, and is most helpful to the student. It seems rather a queer thing that an encyclopædia, the subjects of which are arranged on an alphabetic classification, should require an index. But it is obvious that since certain articles are as big as ordinary books, it cannot be always

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## *A Guide for All Students*

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possible to set out the matter in such a way that the general reader can be sure to pick out just those elements that he may happen to need at a particular moment. There cannot be a separate heading for every item that is to be found within the covers of such huge books.

To illustrate the use of the encyclopædia, let us take my experience with regard to an Italian called Uccello. I had a vague impression that I had read or heard somewhere that this Uccello was the originator of the science of Perspective. I had occasion to use the origin of certain sciences as an illustration in a lecture I was preparing, and I wanted to verify my vague impression. Now this verification of floating knowledge is one of the chief functions of the encyclopædia. Accordingly I turned to my *Britannica* (which was the Ninth, and not the newest, Edition) and looked up under U, but found no reference to Uccello. Next I looked up the index and there found a reference to a mountain in Italy called by this name. This did not promise very much, as I was in search of a man, not a mountain. However, in case there might be a connexion between the man and the mountain, I turned as directed to Vol. XIII and found that the Pizzo d'Uccello was 6155 feet high. As this did not seem to advance matters much, I deserted Uccello and turned to *Perspective*. But all the *Britannica* had to say under this head was "See Projection." Naturally I proceeded to see Projection. But there I had little satis-

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## *Making the Most of One's Mind*

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faction, for the gentleman who treated of Perspective as part of this subject was too much taken up with his complicated drawings to spare any time for the history of the development of the science. Turning, however, to the small print at the end of the article, I found the note that Perspective dates back to the time of the Greek mathematicians, but that its modern developments cannot be traced farther back than the time of the Renaissance, "when the first books on the subject appeared in Italy." This so far confirmed my first impression, but it was now necessary to find out what Uccello's share was in this development.

My next reference was to *Harmsworth's Encyclopædia*, where under the heading Uccello I found that this was the name of a person known otherwise as Paolo di Dono, who was born at Florence and lived from 1396 to 1475; that he was a pupil of and collaborator with the famous Ghiberti; and that he afterwards studied painting. *Chambers' Encyclopædia* did not include Uccello under U; but in the article on Perspective this book told me that the subject was known to the ancients, that the knowledge had been lost during the dark ages, but had been revived by Albert Dürer, and Brambantino, and that its rules had been extended by Peruzzi and Ubaldi (about 1600). This did not look very well for Uccello's claims, and gave me a bias against him, for I had been asking myself why he had acquired the additional name Uccello. I knew that this was



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## *A Guide for All Students*

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the Italian word for a bird, but that it was also used in a contemptuous sense to mean a simpleton. I asked myself whether the man di Dono was called Uccello in contempt. Everything tended to discountenance the view that he had originated the science, and had I had to make up my mind on the spot, I should have voted against him.

Fortunately, however, I was not pressed for a decision, and I was able to wait till next day, when I could consult authorities that were not available in my study. In the newest edition of the *Britannica* I found that the index gave three references to Uccello, one under *Bellini*, one under *Glass*, and one under *Fresco*. But on turning up the places I found nothing but a passing reference to some of Uccello's paintings. With the *New International Encyclopædia* I was more fortunate, for under Uccello I was told that he was so called because of his fondness for birds. This cleared him from the charge of being a simpleton. But more important was the note that "under Manetti he acquired the facility in Perspective which became the main feature of his work." This closed the inquiry, so far as my purpose was concerned. If Uccello had a master in Perspective he could not properly be said to originate the science, though he might well be its most brilliant exponent. Had my main interest been in the evolution of Perspective, my next proceeding would naturally have been to follow up Manetti in his turn. Indeed there is always a temptation to the intelligent

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## *Making the Most of One's Mind*

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student to follow up any inquiry on which he starts. But this temptation must be resisted. When we are at a loose end, it may be quite a desirable thing to follow up interesting investigations, but we must keep in view in our studies the main lines, so as to make systematic progress, and not be allured into following the strange gods of desultory reading. So long, however, as we maintain a rational connexion among the various parts of our studies, we may find it highly desirable to follow the clues supplied by books of reference.

While the encyclopædia may be regarded as mainly a first-aid knowledge-provider in cases of emergency, it has also a function that connects it with the text-book. A student may want not so much help with a particular point as a general treatment of a subject with indication of how to get further knowledge about it. Now at the end of every article of any importance in a modern encyclopædia there are to be found a few notes about where further information on the subject treated is to be obtained. Notes of this kind, giving references to books or periodicals or documents where further information may be had on a given subject, are called bibliographies, and it is becoming more and more usual to give a bibliography, not only at the end of an important article in an encyclopædia, but also at the end of an ordinary book. These bibliographies serve the double purpose of giving the reader some idea of the sources from which the

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## *A Guide for All Students*

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author has derived his information, and suggesting lines along which the reader can proceed in working up the subject still further. It is becoming more and more usual in giving such bibliographies to supply a running commentary on each of the books or papers mentioned, so that the reader is enabled to know the sort of information he may expect to get from each of them. For it is not to be supposed that an ordinary reader is in a position to read all the books suggested on a given subject, even if he were able to procure them.

Elderly teachers, professors, clergymen, and literary men generally have a little grudge against young people who have essays to write or addresses to deliver at literary societies. These young people have an exacting way of writing to their elderly acquaintances, and even to people whom they have never met, asking for a list of books on the subjects on which they have chosen to write or speak. But a great part of the value of the training involved in preparing such essays and speeches is gained by discovering sources for ourselves. The lowest state of all is that of the person who says, "I am very anxious to write, if I only knew what to write about." This is a hopeless case, and such persons should be urged not to trouble about writing at all. But once you have selected a subject, there need be little difficulty in getting sufficient matter. Locke has an account of the pitiable condition of children who are asked to do a composition and wander about

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## *Making the Most of One's Mind*

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among their elders saying "pray give me a little sense." These children are in exactly the same position as those who plead for literary help. Some of them, in fact, do not content themselves with asking for a list of books, but coolly ask for "arguments and lists of heads and illustrations." Consider here what we have already said about providing our own premises. It is not, of course, possible to invent facts. We must content ourselves with the facts that are available, but in constructive thinking the choice of relevant facts is of the essence of the whole matter. In dealing with a book that has been recommended to us by some one else we must still, it is true, make our own choice of the facts that are of importance for our purpose. But the choice of the book itself is a preliminary for which we ought to make ourselves responsible.

With the abundance and variety of books of reference now available there is not the slightest difficulty in boring into the very heart of any subject. An ordinary alphabetical encyclopædia provides an immediate introduction to the subject as a whole, and supplies you with a list of books, any one of which is almost sure to give references to many more. Before you have spent a fortnight on the subject you have at your disposal a list of books that would take years to exhaust. Naturally you have to exercise a certain amount of common sense and intelligence. That's what study is for. If you are invited to give an account of Shakespeare's England,

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## *A Guide for All Students*

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it is not reasonable to turn to the encyclopædia and read up all it has to say about Shakespeare, and then all it has to say about England. A great deal of the article on Shakespeare will be found to be quite irrelevant, and practically the whole of the article on England is beside the point. The real problem is what sort of England did we have between the years 1564 and 1616?

The answer is not to be obtained directly from any one article. You have to look at the matter from the point of view of history and common sense. You will turn to your old history book that you studied as a pupil, and there look up your period and revive your memory of what the late Tudor and early Stuart period was like. You will pay special attention to the section on social conditions. Then you will turn to whatever books on Shakespeare are easily accessible, and glancing through the contents and the index select whatever seems relevant to the particular matters you are considering. The *Britannica* article on Shakespeare, for example, gives about six large pages at the beginning to matters that directly bear on this subject. There is a mixture of geography and history that supplies just the material you require, and if you have in view only a short school essay, you have all that is necessary. But even for this purpose it is always well to consult more than one authority. What is wanted is *your* reaction to the facts that you discover, not a mere restatement of what you find in a book, and naturally

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## *Making the Most of One's Mind*

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if you have consulted only one book you have a strong tendency merely to reproduce, whereas when you have consulted many authorities, you must at least collate.

If you have in view a more ambitious essay, you will naturally have to go farther afield. You will, of course, consult the bibliography at the end of the Shakespeare article, and see first which of the books referred to bear upon your subject, and then which of these suitable books are available at whatever library is open to you. Naturally you will consult the "subject catalogue" at your library, under various heads that you think likely to offer help: Shakespeare, History, Literature. You may chance upon a book with the very title of your essay. If you do hit upon a volume on *Shakespeare's England*, you will find it almost as great a hindrance as it is a help. While it supplies you with a great deal of matter, it limits you, because it treats that matter in a certain way, and you will find it very difficult to avoid adopting the same line of treatment. Many writers when dealing with a given subject of a literary kind, carefully avoid reading anything that is written definitely under the same title. They want to be able to deal with the matter freely. You must remember that it is a restraint even to have to consider how another person has dealt with the same matter.

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## CHAPTER VIII

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### LISTENING AND NOTE-MAKING

**G**REAT as is the difference, many people do not discriminate between hearing and listening. To hear is merely to exercise one of our senses, to allow certain stimuli to produce a certain reaction on the brain with a corresponding effect commonly called a state of consciousness. We are intellectually passive in the process. Certain sounds appeal to our ear, and we may or may not attach a meaning to them, but in any case we are not exerting ourselves in the matter. In listening all this is changed. We hear as before, but we hear with a purpose: we put ourselves in the way of hearing: we direct our hearing. When anything of interest is uttered within our hearing, we are said to prick up our ears, which is only another way of saying that hearing has passed into listening.

Some people are said to be good listeners, but very often they turn out to be nothing more than good actors. It is said, by those who know, that a good actor is easily detected by the way in which he

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## *Making the Most of One's Mind*

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listens on the stage. The poor actor thinks he has done his duty when he has said his piece to the best of his ability, but the good actor is as keen on his work after he has spoken as while he was speaking. He is acting all the time. He must not only hear what the other actors say, but he must seem to hear. He must convey the impression that he is listening. A good listener in society often contents himself with seeming to listen. The student, however, must not only appear to listen, he must really listen. He must give his mind to what is being said.

Even in an ordinary class-lesson, during which the teacher does a certain amount of telling, and a certain amount of questioning, the pupil must expend some energy in listening; but when it comes to what is technically known as a lecture, the strain of listening is greatly increased. Preaching has been defined as "an animated dialogue with one part left out." The definition might be passed over to lecturing, with perhaps the omission of the word "animated," for all lectures cannot claim to have the rousing power that ought to be found in all sermons. The important thing in dealing with lecturing is to understand that it implies two aspects, the speaking aspect and the listening aspect; and that both aspects are active. Lecturing is thus a bi-polar process. But so is ordinary teaching. There is always the teaching pole and the learning pole. But in the ordinary class-lesson this polarity is made manifest. There is open give and take, overt action and reaction. In



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## *A Guide for All Students*

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the lecture all the activity appears to be on one side. The speaker seems to be doing all the work while the audience merely sit passively, and are acted upon. But this is only an appearance. So long as the audience is listening there is activity. It is true that quite a large number of an ordinary audience are merely hearing, some of them probably do not even hear. But wherever there is intelligent listening there is active action and reaction going on between the lecturer and his audience. The listeners respond to the stimuli supplied by the lecturer. Sometimes they agree with him, sometimes they differ from him, but always they react in some way or other upon what he says. They may be finding illustration of the truth of what he is saying, or they may be calling up cases that seem to discredit his generalizations, but in all cases they are supplying, for themselves, the one part left out.

Leaving out of account those whose minds are wool-gathering, and who therefore do not hear at all, and those who merely hear without giving their mind to the subject, and dealing only with those who are really listening, we find that even with this intelligent remnant there is not that steady attention that is sometimes supposed. After an hour's lecture it is not uncommon to find many who think they have been listening steadily all the time. But this is not really the case: all listening is intermittent. We found that attention is always more or less rhythmical in its action. The concentration beat

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## *Making the Most of One's Mind*

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and diffusion beat that we have already considered leave their mark on listening. Sometimes the listener gives his close attention to the very words that are being said; at others he allows his mind to play round what has just been said, neglecting for a moment the present words of the lecturer. But this is a mark of intelligent attention not inattention. In point of fact in listening, as in reading a book or in reading music, the mind always goes on a little in advance of what the senses present to us. In reading aloud we always anticipate what is coming. Most intelligent readers have their eyes far ahead of the words they are actually uttering at any given moment. The skilled musician's eye outruns the touch of his fingers on the strings or keys. So in listening, the mark of the expert is his power to project himself into the mind of the speaker, and anticipate what is coming. The really capable listener often goes far ahead of the speaker, and waits for him at what may be called the parting of the ways in dealing with the subject. "When he comes to this point, will he take this direction or that?" the trained listener will ask himself. Indeed the intelligent listener is asking himself questions all the while. His mind is not merely acted upon by the stimuli supplied by the speaker: it plays around all the ideas presented, and comes to its own conclusions. If you wish to make the best use of lectures, you must be prepared to take a very active part in the work.

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## *A Guide for All Students*

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Inexperienced listeners often lose a great deal of the matter presented to them. In listening to an ordinary sermon, for instance, most people carry away only isolated parts of the whole. They listen in patches, and from what they hear are influenced by the power of association, and let their minds wander. This seems a little like what we have said happens in the case of intelligent listeners, but there is this marked difference. In both cases, no doubt, the mind is allowed to play round the subject, but the intelligent listener limits the attention to ideas that are connected with the main subject, while the careless listener allows association to carry his mind wherever it pleases. Further, the intelligent listener, giving his attention to the subject as a whole, is able to discriminate, as he goes along, which are the really important points and which are more or less subordinate. He utilizes the time given to subordinate points to make good his mastery of the important ones. The unintelligent listener allows his mind to wander off, now after important things, and again after unimportant, without discriminating between them.

The student's attitude towards a lecture must vary according to the nature of the lecture. Broadly speaking the lectures to which the student is called fall into two classes. They are either inspirational or didactic. Some lectures, particularly in literature, philosophy and art, are meant mainly to stimulate the mind, to rouse enthusiasm, to guide taste.

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## *Making the Most of One's Mind*

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The communication of knowledge is a subordinate end in such lectures. As we have seen in dealing with constructive and assimilative study, we can never quite dissociate the manipulation of knowledge from the acquiring of knowledge. But in inspirational lectures the emphasis is on the application and appreciation of knowledge rather than upon its acquisition. We learn a great deal from such lectures, though not in the form of what may be called new facts.

Take the case of a lecture delivered by Sir Walter Raleigh of Oxford on "How to Read Poetry." I do not think I ever heard a more useful lecture, and yet none of the audience went away with many new facts. They did, however, carry away a multitude of new impressions. Many of them would certainly behave differently with regard to poetry from that day forward. I have called the lecture useful because I think it could not help producing a practical effect on the persons who had intelligence enough to understand it. But probably the best term to apply to it would be *instructive*. Very commonly the word instruction is used as if it were merely another term for the communication of knowledge. But literally it means something quite different, and it may tend towards clearness if we try to keep the literal meaning of the word, though you will remember that it is not commonly used in the sense to which I propose to restrict it here. In Latin the word *instruere* means to arrange in proper order,

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## *A Guide for All Students*

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and in particular to draw up in order of battle. Applied to education, then, the word *instruction* might be wisely limited to the meaning of arranging our ideas, putting them in their proper order. By their proper order we naturally mean the order that is best for the particular purpose we may have in view at the time. The teacher who is a good instructor in this sense is the man who has the power to arrange all our ideas in the best way to deal with the subject he is teaching at the time. He draws up our ideas in the order of battle in our struggle to acquire knowledge.

It will be evident that instruction does not necessarily include the imparting of new facts, though it does imply the giving of new points of view. It is quite possible to read a book and get from it no new separate individual fact, and yet to get up from reading it with the justifiable feeling that you have a better grip of the things you knew before; that, in fact, you have enriched your knowledge, though you may not have increased the number of isolated facts at your command.

On one occasion a well-known pleasure steamer full of tourists lay off Constantinople for several days. After the sightseers had spent some days among the interesting places on shore, a distinguished literary man among them gave his fellow tourists a lecture on Constantinople. His discourse gave great satisfaction to the ladies on board, but the men were harder to please. There arose a discussion in

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## *Making the Most of One's Mind*

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the smoking-room, in the course of which it was maintained that the lecture did not contain anything new. One of those betting men who infest smoking-rooms went so far as to make a wager that no one could point to any fact in the lecture that was not to be found in Baedeker's Guide-Book. The wager was taken up, but the unfortunate defender of the lecturer was unable to produce a single element that the smoking-room people would recognize as a new fact. The money was handed over and the smoking-room came to the complacent conclusion that the lecture was bad—which was where the smoking-room was dismally at fault. All the hard facts, no doubt, had been forestalled by Baedeker. But the same facts made quite a different appearance, and conveyed quite a different impression when they were presented in the lecture. As found in the guide-book, the facts were dead, inert matter: as they came from the mouth of the speaker, they lived and palpitated. Further, they were presented in a way that gave meaning to the experiences the tourists had had during their wanderings through the city. They were presented in the order that suited the particular occasion: some were emphasized, some lightly passed over, so that the whole effect was harmonious. As found in the guide-book, the facts were all of equal importance: there was no light and shade among them: they were the same for the whole world. As presented in the lecture, the facts were not different from what they were in the book,

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## *A Guide for All Students*

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but they produced a different effect. The lecturer, in fact, did not inform his audience, but he did instruct them.

A lecture like this one on Constantinople does not bear publication, since its main value was in its applicability to the special circumstances of the case. Sir Walter Raleigh's lecture is still less fit for publication, for quite a different reason. Its value consisted mainly in the illustrations. By reading poetry in wrong ways and in right, he *showed* how poetry should and should not be read. No form of words could convey the effect of his voice and manner. To illustrate, for example, the fallacy of the popular advice of the teacher to the pupil "Read as you would speak," he read over with great dignity and in a sonorous voice the passage:

"And when Saul saw David go forth against the Philistine, he said unto Abner, the captain of the host, Whose son is this youth? And Abner said, As thy soul liveth, O king, I cannot tell."

Then he repeated the passage in a colloquial way, jerking his thumb over his shoulder to indicate where David was supposed to be. Now the repetition of this incident to you has only irritated you. My report has not conveyed to you anything like the impression that the lecturer did to his audience. Your own experience has probably shown you how foolish it is to try to make people get enthusiastic over a speech that you have heard but they have not.

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## *Making the Most of One's Mind*

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Certain things cannot be communicated by a mere report.

There are, however, other kinds of lectures that are quite suited for report. Their main function is to communicate or at least to organize knowledge, and the facts communicated may be quite well reproduced in black and white for the use of another. We are at present, however, more interested in the students who themselves attend lectures, and who are aware that though they hear a lecture it does not follow that they are able to retain all the information it supplies. Experiments have been made to determine how long the mind can retain on the average the new matter that is presented to it. The results are rather startling. They are thus expressed by a competent psychologist, when speaking of the result of the teaching at any class-lesson in the ordinary school course:

"Remember that about half of the new matter presented is forgotten after the first half-hour, two-thirds in nine hours, three-quarters after six days, and four-fifths after a month."<sup>1</sup>

It is absolutely necessary, therefore, that the student should make some arrangement by which it is possible to revive his impressions. He must make some permanent record by means of which he may be able to recall at will the important facts communicated by the lecturer. For the genuine student

<sup>1</sup>Felix Arnold, *Attention and Interest*, p. 242.



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## *A Guide for All Students*

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this matter of making a record of what he hears is of the first importance. Dante tells us that—

“He listens to some purpose who takes note.”

But to take note is not quite the same thing as to take notes. Sometimes, indeed, the two may be antagonistic. The need to take notes may prevent the student from genuinely taking note. Obviously the mere fact that he has to give a certain amount of attention to the mechanical process of recording what he hears tends to weaken the student's power of appreciating its meaning—at any rate, for the time. Accordingly it is desirable that we should give this matter our serious attention. There are various forms of note-taking, and each deserves consideration.

I. There is first of all the verbatim report. To adopt this method implies a knowledge of shorthand sufficient to write about 130 words a minute. Few students possess such skill; so it is comforting to reflect that this form of lecture note-taking is not necessary, not even desirable. A knowledge of shorthand for use in other parts of his work is an excellent thing for the student. But those who have no skill in shorthand may console themselves by remembering that no lecture is worth reproducing word for word. If it is so full of matter that every individual sentence is essential, then the lecture is over-loaded and as a lecture is bad. It ought to form a chapter in a textbook. If, on the other hand,

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## *Making the Most of One's Mind*

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the lecture is an inspirational one and depends upon its excellent expression, then in its written form it will lack that personal vivacity that the lecture-room makes possible. In this case the student during the delivery would have to miss the thing that gave the lecture its main value, in order to be able at his leisure afterwards to get its purely secondary value. What gives a lecture its importance as compared with an essay is that in the lecture we are brought into the actual presence of a man who is at home in the particular subject that he is dealing with. If we spend our whole time, then, in writing down what he is saying, we lose the only thing that justifies our preferring the lecture to a published work.

Still it may well be that as a mere matter of communicating knowledge the lecture may occasionally occupy a specially commanding position. It may contain matter that is not to be obtained elsewhere. In this case it is obviously necessary to write down this special matter in order to make it our own. This, however, is seldom the case nowadays, particularly in the lectures that students are called upon to attend. If a great scholar or savant is giving the results of his studies, everybody who attends his lecture knows that it will be published almost immediately, and that in any case a much better report will be published in next day's papers than any ordinary hearer could make for himself. But it is the main business of a lecturer to students to present established facts in the most effective way, rather

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## *A Guide for All Students*

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than to present facts of which he has the monopoly. It is not to be forgotten that lecturers do excellent work by presenting facts in the way that is most convenient for the particular persons they are addressing. All that is said may be found in books, but those books may not be readily accessible, and in any case young students may not have the time to seek out the knowledge that is widely scattered over many books. In view of all this, it is clear that it is not necessary to write down every word that any lecturer says, however distinguished he may be. In every lecture there must be a certain amount of "padding," that is material to fill up space. This is not written by way of complaint. Padding in a lecture is as useful and as necessary as connective tissue in the human body. It is necessary that the various organs of the body should be kept together and the interstices decently filled up. Accordingly, there is found in the body a certain neutral substance known as connective tissue. In its negative way it is of vital importance. So in a lecture, the important and significant points must be kept in their proper relation to one another by an appropriate amount of verbal matter that is not in itself of value. In taking notes you will find this mental connective tissue an excellent thing to omit.

It has to be remembered that a lecture is not merely a chapter from a text-book read aloud to an audience. A delivered address differs in kind from a printed pamphlet. The very style of the English is

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## *Making the Most of One's Mind*

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different in the two cases. If you care to look into this matter you will easily note the difference. You will probably remember from your text-books in English that there are two kinds of sentences, the loose and the periodic. Experience shows me that students, when asked their opinion about which of these kinds is the better, vote overwhelmingly in favour of the periodic. The name naturally produces this result. What can you expect from a sentence that is deliberately labelled "loose." And yet there is a great deal to be said in favour of this style of sentence in lecturing as opposed to writing. If you take careful note of the language of your lecturers, you will find that the sentences are mostly loose.

You remember that the loose sentence is one that begins in an easy, straightforward way and goes on from point to point without elaboration and making each clear as it arises.

If you turn to your *Robinson Crusoe* you will find that it begins: "I was born in the year 1632, in the City of York, of a good family, though not of that country, my father being a foreigner of Bremen, who settled first at Hull: he got a good estate by merchandise, and leaving off his trade, lived afterward at York, from whence he had married my mother, whose relations . . ." and so on. Each point as it rises explains itself, and there is no reason why the sentence should stop at one place rather than another, except the consideration of length. The periodic sentence, on the other hand,

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## *A Guide for All Students*

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is so organized that the full meaning cannot be known till the end has been reached. All the conditional clauses are placed first, and it is only at the end that the full meaning becomes clear.

"That St. Paul was struck blind at Damascus, that he had to gaze steadfastly in order to distinguish the High Priest, that he wrote to the Galatians in large characters, that these same Galatians were at one time willing to give even their own eyes for him, all lead us to believe that . . ."

Up to this point it is almost impossible to guess what the meaning of the whole sentence is. But when the words are added:

". . . St. Paul's 'thorn in the flesh' consisted in a weakness of the eyes," we are clear about what the author means, whether we agree with him or no.

Now of the two kinds of sentences it will be admitted that the loose is the better for the purposes of the lecturer. The periodic sentence is quite admissible in print, for the reader may turn back to the beginning of the sentence and see whether the arguments there offered justify the conclusion reached. But the mere listener is not in this position. If a long sentence depends for its ultimate meaning upon the last clause, it is plain that the listener is placed at a great disadvantage. You will not make the mistake of thinking that all this forms a plea for careless composition in a lecture. All that is claimed is that the composition of a lecture should be different in kind from that of a printed essay.

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## *Making the Most of One's Mind*

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So with the arrangement of matter. Certain things are permissible in a lecture that would be out of place in a book. For example, not only is a certain amount of repetition not objectionable in a lecture, it is positively desirable. This does not mean mere verbal repetition, but repetition of the same matter in a slightly different form. Necessary as are these repetitions, they need not appear in the student's notes.

II. The second kind of note-taking is, if anything, worse than the verbatim form. It consists in writing out as much of the lecture as the student can manage to get down in longhand. This really is an attempt to treat the lecture as a sort of dictation lesson. The question was, indeed, seriously discussed long ago among the Jesuits—who are noted for their skill as teachers—whether lecturing should be so carried on that every word of the lecturer could be taken down in longhand. The result of the discussion was that *dictation*, for they recognized that this was what the proposal amounted to, was rejected as uneducational. A compromise between the verbatim and the dictation method is sometimes adopted by professors, who insist upon their students really listening to them while lecturing, but who make up for the prohibition of note-taking during the delivery of the lecture by pausing every ten minutes or so and dictating a short paragraph containing the substance of what has been said. If you care to turn to Sir William Hamilton's published lectures, you will find these dictated passages marked by a little circle. If you

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## *A Guide for All Students*

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read over the lecture first and then read over the dictated paragraphs consecutively, you will find that these paragraphs contain the essence of the whole lecture.

What weighs a good deal with students in their attempts to get as much of the very words of the lecture as they can, is that in many cases the lecturer is also the examiner in the subject, and there is an ineradicable belief among students that the lecturer always likes to get back his own words. You may rest assured that the belief is unfounded. Even the most conceited lecturer soon tires of his own words frequently repeated. You will fare much better at your examination if you rely upon mastering the meaning, and clothing it in your own language. The inevitable result of the desire to write down the bulk of the lecture is that the students lose the meaning of the lecture as a whole. In the pursuit of the shadow they lose the substance. They are kept so busy writing down the mere words that they have no time to give to the sense. Further, the handwriting degenerates under the strain, with the result that the students first of all spend the whole lecture hour merely scribbling down as much as they can, then they have to waste a great deal of time deciphering the very words they have written, and finally they have to enter upon a struggle to get some meaning out of the whole.

III. Accordingly, there is a natural tendency to adopt the third kind of note-taking, which has at

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## *Making the Most of One's Mind*

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least the great advantage that it permits of intelligent listening. This consists in writing down nothing but striking facts or expressions, whatever, in short, appeals to the student as worthy of special notice. In a didactic lecture, for example, a great many individual facts are usually given, and many of these are worth noting at once, since the facts are useful in themselves, and can be jotted down without undue expenditure of time and without distracting attention from the main subject of the lecture. But sometimes a series of facts or figures is given, not for the value of any single fact or figure, but for the cumulative effect of the whole. To prove that a particular act of legislation produced a certain definite effect on a particular industry, the lecturer may quote lists of annual returns. These make their proper effect, but it is not necessary for the student to get them all down in his notebook. It is enough if he notes the general statement to be proved and the *source* from which the quoted figures are derived. The skilful lecturer strives to put in a tabular form all the information that he wishes his students to take down. This he puts upon the blackboard, and it is for the student to determine—if the lecturer gives no hint—whether the table is worth reproducing in the notebook or not. As a rule the lecturer makes an allowance of time for taking down such tables as he considers necessary.

The tendency of this form of note-taking is to be quite unsystematic. All that it does is to save cer-



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## *A Guide for All Students*

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tain facts from the wreckage, and to leave certain marks by which lost treasure may be recovered. Very often these marks need not be at all elaborate. A single word may be sufficient to recall and elaborate illustrations that in their original form took quite a while to work out. This was the method adopted long ago in reporting the speeches made in the House of Commons when it was not permitted to make notes on the spot. Those whose business it was to give an account of what took place in Parliament made some surreptitious notes of striking points, and then went home and worked up the speech again from memory as well as they could. Something of the same kind must be done by the student, for unless the notes are worked up into a reasonably intelligible shape they soon cease to have any value at all. At the time, they have a suggestive value: the mind is able at once to respond to all the suggestions of each of the scanty notes, but after the interval of a day or two they lose this power and become nothing more than a means of tantalizing the student, who knows that they used to have a meaning, but is now unable to recall what it is.

Accordingly there is urgent need for the student who has taken notes of this kind to elaborate them as soon as possible. This is usually called "writing up" the notes, and often entails a heavy expenditure of time. Since the notes are necessarily not self-interpretive, if they are left over for a day or two the result is disastrous. Even when the notes are

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## *Making the Most of One's Mind*

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fairly intelligible in themselves, it is always desirable to expand some of them, and to supply connecting links here and there, so as to make quite sure that there will be no misunderstanding of their meaning in the future. There is the additional advantage that the mere fact of revising the notes revives the impressions made during the lecture, and therefore strengthens the mind's grip upon them.

IV. Many lectures, however, are not made up of mere statements of fact that can be recorded in the straightforward way we have been considering. They demand consecutive thinking throughout the whole period devoted to them. This is the kind of lecture that demands serious attention during its actual delivery. The student must listen to it as it comes from the lecturer's lips, or it is useless at the time, and beyond the power of recall at a later stage. The style of notes that such a lecture demands is what may be called the skeleton outline. There is no time for writing out complete sentences if the student is to keep on following the speaker's thought, and yet there are usually very few catchwords, or definite concrete facts to seize upon as guides. On the other hand, such lectures are usually prepared with considerable care, and therefore follow a definite plan. Sometimes the lecturer is good enough to explain this plan. He tells the audience at the beginning exactly what he proposes to do, and then proceeds to do it. He tells them, for example, that he intends to deal with his subject under the following

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## *A Guide for All Students*

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heads, which he then proceeds to state. Sometimes he goes further and supplies sub-heads. There is, of course, danger here of the lecturer becoming pedantic and paying more attention to classification than to the essentials dealt with. But this is the lecturer's look out. It is the business of the student to take down all the heads that are supplied, and to fill in under each head as many sub-heads as he thinks are implied in the treatment. Frequently, however, lecturers prefer to keep their classification to themselves. They, of course, have the necessary heads and sub-heads, but they think it inartistic to proclaim them. In this case it is the student's business to unearth the heads for himself.

To do this successfully demands a good deal of practice, but it is practice that well repays the time spent upon it, since it really implies a training in logical analysis. A student who can make up a fairly accurate analytical classification of the matters dealt with in a lecture has proved himself a master in his craft. To acquire this skill, however, the prudent student will begin outside the lecture-room. He cannot afford to muddle important lectures in his early attempts. As we learn shooting by beginning with a fixed mark and then passing on to flying objects, so we should begin our analytical note-making with a printed lecture, and pass on to a spoken one only after skill has been acquired in dealing with the more amenable printed form. You cannot do better than begin by reading over the

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## *Making the Most of One's Mind*

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printed lectures of some master of the craft, and then making from the text a set of heads and sub-heads. Take, for example, a series of lectures on art that Ruskin once delivered to his students at Oxford. These are now published in the form of a book under the title of *The Eagle's Nest*. They are specially useful for your purpose, since they are very well arranged, rather short (they are somewhat abbreviated from the form in which they were actually delivered), contain suggestions of classification, and are in themselves very interesting. Some of Huxley's popular lectures, such as those on "Coal" and "A Piece of Chalk," will form thoroughly good matter for further practice. In order that you may understand precisely the sort of thing that is wanted, I supply at the end of this chapter an analysis of the kind I mean, made from Chapter IV of this book. You should turn back to Chapter IV and reread it, making such notes as you think necessary, then turn to the analysis and compare what you have done with what you find there.

After you have done some of Ruskin's lectures and some of Huxley's—or some other lectures that you may have by you, for it is not necessary to have the special lectures mentioned above—you will find yourself beginning to understand the sort of thing to look for in a lecture or article. You will soon be able to determine whether a lecture is well organized or not. For you will not infrequently

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## *A Guide for All Students*

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find that it is impossible to discover suitable heads and sub-heads, for the excellent reason that there are none to discover. After this practice with printed matter, you will find yourself in a much better position to deal with an ordinary lecture delivered to a real audience.

The advantage of setting about finding the appropriate headings is that it puts you in the most favourable position for listening to the lecture. You come to it with your mind prepared. There are certain questions that you want answered. Knowing the nature of the subject, you wonder whether the lecturer will take it in this way or in that. You may know nothing at all about the details of the subject, and yet coming prepared in a general way for the subject, you are in a position to fit in each of the facts presented into its proper place in relation to other facts and to the subject as a whole. It is the business of the lecturer to put himself in the place of his audience and present his facts in such a way as to meet the special needs of the audience here and now before him. But his work is ever so much more effective if his audience meet him half-way. To get the full benefit of a lecture the hearer must bestir himself, and must feel responsible for at least half of the activity going on.

It is sometimes said that at the end of a well delivered and well listened-to lecture the audience should have in their minds exactly the mental con-

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## *Making the Most of One's Mind*

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tent on the subject that was in the mind of the lecturer just before the lecture. The same view is sometimes expressed by saying that at the end of a well delivered lecture the notes in the pupil's notebooks should coincide with the notes on the lecturer's sheets. But this does not by any means follow. The lecturer uses his notes for a purpose quite other than that of the listener. He may put down a great many facts that are of value as illustrations and yet are not worthy to be copied down by the students. The lecturer, for example, may in his notes write out in full a long quotation from some authority. Merely to refer to the authority and explain in a general way what the authority thinks of the question is not enough. A paraphrase does not satisfy: the very words are essential. On the other hand, the student may dismiss this with a mere note of the name of the authority, the reference to where the words are to be found, and perhaps a phrase indicating the kind of evidence contained in the passage. The lecturer may have a large page of manuscript taken up with a passage from J. S. Mill, while the student may merely write the words: "Mill's *Logic*, Bk. I, chap. v. §4 Ethology = Science of Character."

In other cases the balance will be readjusted, for a mere word or two may be enough to suggest to the lecturer what has to be said upon some aspect of the subject with which he is very familiar while for the sake of his future comfort the student will

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## *A Guide for All Students*

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be wise to jot down several phrases. In fact, the notes of the lecturer are modified by his special knowledge of the subject, the special needs of the particular class he is dealing with at the time, and also by the personal peculiarities of the lecturer himself. In the same way the students have each a personality that will be reflected in the kind of notes taken. Even in a well arranged class there are great differences among the students with regard to their previous knowledge of the subject, to say nothing of their personal peculiarities. All these may and should be reflected in the notes. Yet when all allowance has been made for the expression of peculiarities, there must be a fundamental residuum of likeness in all the notes that are well made. There is a sort of lowest common denominator that should be implicit in every set of notes. The essential points should be present in each and in the same order. A skilful person, familiar with the subject matter, from an examination of any three sets of satisfactory notes on a given lecture should be able to reconstruct that lecture very much as it was delivered. For the student it will be enough to be able to reproduce the lecture as it affected him.

### ANALYSIS OF CHAPTER IV

#### I. THE TWO KINDS OF STUDY—assimilative and constructive.

##### A. Relation of student to his surroundings.

a. Absorbing and being absorbed by them.

b. Result of reaction: being at home in his surroundings.

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## *Making the Most of One's Mind*

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- B. Turning fact into faculty.
  - a. Knowledge as impression and as expression.
    - i. Static—mental content (making outer inner).
    - ii. Dynamic—mental activity (making inner outer).
  - b. Relativity of value of facts.
- C. Acquisitive study—depending largely upon memory.
- D. Constructive study—involving some form of reasoning.
  - a. Manipulation of Knowledge, and application to new cases.
  - b. Apperception.
    - i. Power of mental content.
    - ii. Assimilation instead of Acquisition.
- E. Necessary interpenetration of the two methods of study.
  - a. In Assimilation reason must play at least a small part.
  - b. In Construction we must acquire *some* new knowledge.
- F. Preferences of students.
  - a. Commonplace students—assimilative.
  - b. Students with initiative—constructive.

### II. THE BUILDING UP OF KNOWLEDGE.

- A. Realm of the Uncertain: Guessing and its bad reputation.
- B. Realm of the Certain.
  - a. The Laws of Thought as Thought.
    - i. Identity.
    - ii. Non-Contradiction.
    - iii. Excluded Middle.
  - b. Conditions of uniform result of honest thinking.
    - i. Adequate knowledge.
    - ii. Absence of bias.
    - iii. Application of the mind.



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## *A Guide for All Students*

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### C. The Realm of Guesswork.

- a. Random Shots.
- b. Relation to hypothesis.

### D. Practical Thinking.

- a. The two main kinds of Reasoning.
  - i. Deductive (true of class, true of individual).
    - 1. Cause of certainty of results.
    - 2. Advantages of the method.
  - ii. Inductive (Uniformity of Nature).
    - 1. Cause of uncertainty of results.
    - 2. Advantages of method.
- b. Progress in Premiss-making or Premiss-finding.
  - i. Number of cases to secure sound induction.  
Value and dangers of *general* rules.
  - ii. Natural connexions involved in cases.  
Nature and use of Analogy.

### III. APPLICATIONS OF THOUGHT.

- A. Fitting of means to ends on ideational plane.
- B. Fumbling and pictorial Thinking.
- C. The place and importance of *therefore*.

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## CHAPTER IX

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### CONSTRUCTIVE STUDY IN TRANSLATION AND ESSAY-WRITING

ONE of the best examples of the working of constructive study is to be found in the translation into English of passages from a foreign language. This always presupposes a great deal of acquired knowledge and skill, and exemplifies their application to a specific problem. If the pupil had to find out afresh the meaning of all the words in such a passage, he would have little chance of ever making sense out of it. At the same time, the ordinary student always does find in the work of translation some words with which he is not familiar or which he has never seen before; and the looking up of these in the dictionary gives that supply of new matter that nearly always accompanies constructive work. Each new passage is necessarily a problem, sometimes easy of solution, sometimes very difficult; occasionally, indeed, with the student's limited knowledge, insoluble.

One of the most useful forms in which construc-

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## *A Guide for All Students*

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tive exercise occurs in school and college, and particularly at examinations, is the translation of what are usually called "unseens." This means that a passage that the student has not seen before is set for translation under conditions that prevent him from consulting a dictionary or any other book that might give him help in the process. Sometimes this exercise is called translation "at sight." As almost every student, at some time or other in his progress, has to face a paper of this kind, it is well to give a few hints on the whole matter, and to supply an illustration of how these hints may be applied.

To begin with, you must start with the assumption that the passage has a meaning: a quite definite meaning. Accordingly, if what you make of it does not seem sense, then you may be quite sure that you are wrong. There may be a possibility of making more than one meaning out of the passage, and you may not be always sure which meaning is the true one, but if you find that what you have written has no meaning at all, then you may rest assured that you have failed. Your first principle, then, must be to make a meaning out of what is presented to you. When you have a choice of meanings, you must see to it that you take into account the whole passage. You must do your best to give to each word the meaning that you have learnt it usually bears, but you ought to make it a principle that the general consistency of the whole passage is a more important indication of

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## *Making the Most of One's Mind*

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the meaning of a word or phrase than what you can remember from your dictionary or your grammar book.

The question is sometimes asked, which is to be preferred, a free translation or a literal one? By a free translation is usually meant a rendering into good, flowing, idiomatic English of the meaning of the person who wrote the passage. The aim is to convey to the English reader the same impression as the foreign writer conveyed to his original readers. Thus we would not render the Latin words *quisque optimus miles* by the literal *every best soldier*, but by the ordinary English *all the best soldiers*. In his orations Cicero addresses certain persons whom he calls *judices*; this being literally interpreted would read *judges*, but this word would convey a wrong meaning to an ordinary English reader, accordingly many scholars would prefer to render it "gentlemen of the jury," though the system of trial by jury was not known among the Romans in the form it has taken among us. *Er steht unter dem Pantoffel*, in German, means literally *he stands under the slipper*: but this is meaningless to an English reader, who quite understands it, however, when it is rendered *he is henpecked*.

Generally speaking, then, the free translation is to be preferred where there is no doubt whatever as to the exact meaning that the original author desired to convey. Sometimes, however, there may be a difficulty in determining whether the author

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## *A Guide for All Students*

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meant what he appears to mean, and in these cases the passage is usually translated literally. When you find a foreign author quoted in translation in the course of an article in English, you will sometimes find that some particular English expression is followed within brackets by the very words of the foreign language. The meaning of this is that the English author wants to give his readers the assurance that he is not unfairly representing the meaning of the author he is quoting in translation.

But in translating as an exercise other points have to be kept in view. Sometimes a teacher insists upon a rigidly literal rendering of a passage, in order to make quite sure that the student really does know word by word what the author wrote. For a clever writer of English it is not very difficult to gather the general sense of a passage and then turn out an elegant English paragraph or two expressing in a broad way what the author meant. The result is rather a paraphrase of the original than a translation of it. So long as you really know pretty accurately the exact meaning of the passage, you are entitled to take a certain amount of liberty in the interests of good English. Speaking generally, younger students are encouraged to give a fairly literal rendering of a passage, while more advanced students are allowed greater freedom.

It may help you to understand the proper point of view to remember the instructions of a distinguished classical scholar to the assistant who was to mark

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## *Making the Most of One's Mind*

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the class examination papers. "Mark the scholarship papers first, and when a candidate shows an accurate knowledge of the details of the language, allow him great scope in his translation. If he is weak in his scholarship, do not give him the benefit of the doubt where his translation is free." If at an examination you are in doubt whether the examiner will give you credit for a particularly free translation, it is an excellent plan to put in now and again, within brackets, the literal rendering of a phrase that you have taken liberties with. If one had time, an absolutely literal translation followed by a free English rendering would remove all doubt, but in most examinations time permits of only a compromise.

Some general considerations may be suggested in the matter of translation at sight, particularly at examinations.

(1) Make the sentence, not the word, the unit of your translations. Do not try to remember specifically all the meanings of individual words as found in the dictionary. Let the context decide the meaning to be borne in a particular passage.

(2) When you have discovered the general meaning of a sentence, you may still be unaware of the exact meaning of some of the words. In this case adopt the most general meaning that will safely fill in the sense. If, for example, you gather that a man moved from one place to another, but you do not know from the verb whether he walked, or

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## *A Guide for All Students*

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ran, or drove, or rode, or rowed, or sailed, or swam, say simply that he *proceeded* there. If we give *Cæsar proceeded to Rome* as a translation for *Romam Cæsar properavit*, we do not get such high marks as if we had known that *propereo* implies *haste*; but we would get more than if we had particularized and said he *sailed*. He may or he may not have *sailed*, he certainly did *proceed*.

(3) On the other hand, wherever you are sure about any detail, do not generalize unless the genius of the language demands it. You are aware that Latin, as a whole, prefers the concrete, and English the abstract. But while in translating English into Latin it is essential to keep this in view in order to give the proper colouring to your Latin version, it is not so necessary to make the English abstract. We know from our own experience whether our translation reads like English or not, so we need not follow abstract rules in the matter; and in point of fact, a concrete expression in English where an abstract one is more usual, really adds piquancy to the style, and at the same time guarantees your acquaintance with the literal meaning of the word translated. By a comforting law of compensation, you will find that the tendency to generalize arising out of your ignorance of the meaning of specific terms, will always supply your English version with its proper bias towards the abstract.

(4) Sometimes you will come across technical expressions and peculiar turns indicated by little

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## *Making the Most of One's Mind*

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words. If these are marked off by commas, and convey to you no sense, while you can make sense quite well without them, your plan is to ignore them altogether. Take such a case as *bien entendu* in French, or '*mal*' in German. They do give a flavour to the sentence in which they occur, and in a fine translation that flavour must be rendered, but in an ordinary translation they may be left out without materially altering the meaning. If you remember that *mal* in German means *time* in the sense of repetition, as in *zweimal* meaning two times, you will be very ill advised to thrust in the word *time*, where the word '*mal*' occurs. Unless you know the exact flavour it ought to give to the sentence, your only safe plan is to take no notice of it.

To give point to what we have said about translation at sight as a constructive study I submit an example. The passage is in French, as that seems to be the language within the range of the greatest number of readers. The principles can be as well illustrated by one language as by another, so those who do not happen to have studied French will at anyrate have the satisfaction that fewer people will be disappointed than if any other language had been chosen.

I have set the passage that follows to several large classes of students, so that I have had several hundred versions submitted by pupils at different stages of advancement. In the comments that I



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## *A Guide for All Students*

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make upon it, I have, therefore, had the advantage of the actual experience of those who have faced it as an unseen. Some of the mistakes the students made seem to mark a very low grade of knowledge and even intelligence. Yet no one who has had much experience in marking unseens will be greatly surprised at anything that occurs in such papers. Besides, the more glaring the blunders, the more strikingly will they serve as beacons of warning.

M. Jolivet est l'homme habitué à fouler l'asphalte du boulevard. Vous le voyez campé d'un air crâne, comme s'il devait tout subjuguer. Au fond, c'est un bon enfant. Il se fourre toujours dans des aventures hasardeuses dont, heureusement pour lui, son esprit et sa bonne humeur parviennent toujours à le tirer. L'autre, M. Blount, le reporter anglais, juché gravement sur son âne, également armé jusqu'aux dents, empressé à devancer son rival en cancons politiques, lui tend des pièges pour empêcher d'arriver *bon premier*.

La chance les favorise tour à tour, ainsi que vous pourrez en juger par vous-mêmes, mes chers amis, du moins je l'espère pour quelques uns d'entre vous. Vous décrire les ballets, les retraites aux flambeaux, les panoramas qui se succèdent, me serait impossible, ce sont des merveilles qu'il faut voir et qui tiennent si peu à l'action qu'on pourrait les montrer à part.

After reading the whole passage rapidly you gather that it is about two men whose names are Blount and Jolivet, the first being an English reporter, and though nothing is said about Jolivet's profession, we are entitled to infer that he too is a reporter, since he is Blount's rival. The second

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## *Making the Most of One's Mind*

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paragraph is obviously about wonderful sights that the two reporters have had to do with, but probably the most characteristic point about this paragraph at the first glance is its unintelligibility.

Going back to the first paragraph we may assume that the average student does not know the meaning of the infinite *fouler*. Assuming that you are the average student, you would certainly know the meaning of *asphalte*, and you would have the idea that *boulevard* was some sort of street, and this is confirmed by the connexion between *asphalte* and *boulevard*. Jolivet is accustomed to do something to the asphalt of the street. Had we not known his profession we might have been much in doubt about *fouler*, for there are a great many things that workmen can do to the asphalt. But in the case of a reporter, it is a perfectly legitimate guess that *tread* is the meaning of *fouler*, since that is about the only thing a reporter habitually does to asphalt. In the second sentence the words *campé* and *crâne* are the only two that are a little unfriendly. A man does *something* with a *certain kind of air*, and since he looks as if he ought to conquer everything, we may make a fair guess that it was a *haughty* air; the intelligent student might even pass from *crâne*=*cranium* or *skull* to the notion of swelled head, and translate it by *swaggering*: then taking the literal meaning of *campé* as *camped*, we may change it into the more general form *placed* or *planted*. *You see him placed with haughty air* is not very far from

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## *A Guide for All Students*

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the truth, and would get some marks, though *you see him standing there with a swaggering air* might get more. *Au fond* means *at bottom* and is one of those isolated phrases that are unsafe to guess. If you do not know it, therefore, you had better leave it out altogether. Since it stands by itself it gets no help from the context, but as a compensation it can be omitted without attracting undue attention. In writing out your translation, give no indication that a word has been omitted. Some teachers insist upon their pupils always leaving a blank in every case where a word has not been translated. This is an excellent plan to help the teacher in his marking of exercises, but it is not to be recommended when you are working an examination paper.

In the next sentence, *aventures hasardeuses* indicates that he got into trouble, but *heureusement* and *bonne humeur* suggest that things ended well, which is precisely the meaning of the sentence. *He always got into perilous adventures* would do, though *he is continually thrusting himself into* is more true to the original. *Juché* is the first trouble in the next sentence; it is something passive, as we learn from its form. Now the most likely thing for an Englishman to do *gravely* on the back of an ass is to sit. *Seated* would therefore do, though *perched* is better. The rest is complicated. You have to consider what you think an English reporter armed to the teeth and perched on an ass is likely to do to a rival. There is a natural tendency to translate *empresé* by

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## *Making the Most of One's Mind*

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*pressed*, and though this is not the true meaning, it gives a certain amount of sense. It is best rendered *eager*: then the next problem is what he was eager to do to his rival. Obviously not to help. *Devancer* suggests getting in front of, and therefore anticipating the rival, in the matter of *cancans*. From the context this last word may be fairly guessed to be *news*, since that is what reporters are most keen to anticipate each other in. As a matter of fact, the word is contemptuous, and is best rendered by *tittle-tattle*, but the more general word will carry you through. You may not remember that the word *piège* means a snare or a trap, but you easily guess that it is something to prevent his rival from making a good first. The sentence presents no difficulties in making a literal translation; the last clause might run *at least I hope it for some among you*, though it would run better *at least I hope so in the case of some of you*.

The last sentence of all is one of those in which the student is sometimes able to give the literal meaning of every word, and yet unable to make sense of the whole. It is difficult to believe how often such a sentence is rendered unintelligible by the remarkable blunder of making the first *vous* the subject of the verb *describe*. Once the student begins the sentence with "You describe" no sense can be made out of all that follows. In an apparently meaningless sentence like this it is often advisable to write out the whole in bald English as a mere literal ren-

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## *A Guide for All Students*

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dering of the words. Thus we would have "You to describe the ballets, the retreats to the torches, the panoramas that succeed themselves me would be impossible; they are of the marvels which it is necessary to see, and which hold so little to the action that one could show them apart." By applying common sense to this hash of clumsy English it is possible to get a meaning that is not very far from the original: "It would be impossible for me to describe to you the ballets, the torchlight processions, the panoramas succeeding each other; they are wonders that must be seen [to be believed or to be realized], and have so little to do with the action that they might be shown by themselves." This implies that they have so little to do with the action of the story being told by the author, that they might be presented as things by themselves.

### ESSAY-WRITING.

To know is one thing, to express our knowledge is another. Yet the two are inseparably connected. We never really know what we cannot in some way or other express. In fact, psychologists have a way of saying that there is no impression without expression. You experience the truth of the intimate connexion between knowledge and its expression every time that you seek to put down on paper what you think you know. So long as the matter was left merely floating about in the mind we could satisfy ourselves that we knew it, but so soon as we proceed

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## *Making the Most of One's Mind*

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to write it down we find certain gaps of which we were before unconscious. But not only does writing discover these disconcerting gaps, but it makes us realize that we have not any carefully arranged plan of relating our ideas to one another. Before we can set out our knowledge clearly on paper we must have first arranged it carefully in our minds. It is for this reason that essay-writing justly occupies such an important place in school and college work. Nowhere can we find a better example of constructive study than in the case of a student sitting down to write an essay. For every essay to be written involves a problem, and a two-fold problem at that. Given the subject, the student has to set about finding things to say about it, and at the same time he has to consider how best to say them.

You are likely to find the double problem of the essay very discouraging. It is always difficult to do two things at once. You are so apt to become absorbed in one at the expense of the other. The tendency of teachers at school is to emphasize the composition side at the cost of the subject matter. On the other hand, the pupils who have the actual essay to write nearly always feel the pinch mainly in connexion with the matter. They are apt to think that if only they knew what to say they would have no difficulty in saying it. In school essay writing the pupil is too frequently put in the worst possible position for doing his work. A very wise and experienced teacher once made the suggestive

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## *A Guide for All Students*

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remark, "There is a world of difference between having to say something, and having something to say." Too frequently the pupil in school is put into the position of having to say something. This is a distressing position and is apt to paralyse him. The skilful teacher will do everything in his power to put matters in such a way that the pupil knows certain things, and is expected to give his views on them. If this is accomplished the pupil is put in the enviable position of having something that he wants to say.

You will see, then, that it is a mistake to separate matter from its expression. There is nothing more dreary than writing merely for the sake of writing. The mere word-monger is apt to become dull and pedantic, while the mere fact-monger is apt to lose the power of clear and accurate expression. This is curiously illustrated by a quarrel that is going on in America as I write, among the teachers of the secondary and technical schools. The teachers are divided into the two camps, the teachers of English on the one hand, and the teachers of all the remaining subjects on the other. It appears that the non-English teachers, especially the teachers of science, are finding that their pupils are unable to express themselves. These pupils have stopped their English course at an early stage, and have given all their time to their other studies, and now it is complained that they have lost their power of expression. The remedy the non-English teachers propose is that all

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## *Making the Most of One's Mind*

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exercises in every subject shall be treated also as exercises in English composition, and marked accordingly by the teachers of English. The plan is regarded by the English teachers as an excellent one, if only the other teachers will do the marking: they decline to be made the mere assistants of the non-English teachers. Thus the quarrel stands: for us the lesson is obvious. We must not separate subject matter from its expression, and the essay is the best form in which the two may be usefully combined.

Some essays require very little preparation in the way of supplying subject matter. They demand nothing more than the writer's personal reaction to certain suggested particulars. If you are asked to write on such a subject as "My Favourite Poem," all you have to do is to make up your mind rapidly which poem you like best, and then describe it and explain as well as you can why it is that you do like it. You have all the materials, as it were, on the premises, and your work lies in making a wise choice among them. Such essays as those of Lamb belong to this class. No doubt many of them contain a fair amount of rather peculiar knowledge used by way of illustration; but we feel that Lamb did not go out of his way to acquire this knowledge for the special purpose of his essay. He draws upon the stores of his memory and experience, but the main value of his work is his personal reaction to the matters he is dealing with. The same is true of practically all the work of those who are known



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## *A Guide for All Students*

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collectively as the English Essayists—Addison, Steele, Goldsmith, Johnson, Foster, and the rest.

But in school and college work there is a sort of didactic essay frequently prescribed, the purpose of which is partly to give practice in composition and partly to encourage the pupil to acquire general knowledge, and consolidate by revision knowledge he has already acquired. For example, junior pupils may be called upon to write upon *Money Orders*. This means that they have to acquire somehow or other a knowledge of what a money order is, how it is used, and any other particulars they think it worth while to learn and communicate. In higher classes subjects of a more complicated kind are set. *The Origin of the Cabinet* is really an exercise in History, *The Panama Canal* in Geography, *The Fools of Shakespeare* in Literature, *The Fertilization of Plants* in Botany.

In all these cases there is no mystery in the matter. Everything is plain and straightforward. You know exactly where to go for the information you require. You are told how long the essay is to be, and all you have to do is to proceed to grind out the required amount. Your personality does not count for very much in such subjects, but it is never negligible. In dealing with Shakespeare's *Fools*, for example, you cannot avoid giving your personal reactions, even though you may find all the essential points of orthodox opinion ready-made in your text book. But in the other subjects men-

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## *Making the Most of One's Mind*

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tioned there is less room for your personality. The Cabinet and the Canal certainly give a little opening for your political views, but the Fertilization of Plants is rather damping to personal reaction. Essays of this kind are merely class exercises of a somewhat elaborate nature. They are more like formal accounts of acquired knowledge, and it is interesting to find that in the American universities professors and students are beginning to speak of *reports* where we would speak of essays. These reports are always understood to imply a certain amount of definite reading, the results of which are incorporated: in some cases, indeed, the report takes the specific form of a synopsis of the student's reading.

Obviously certain subjects lend themselves to treatment on either the personal or the report method. Suppose, for example, the subject of *Dreams* is set. You may fairly fall back entirely upon your own experience, describe the dreams you and your friends have had, give your memories of classical dreams, and your impressions of what they are all worth. You may bring in Joseph, Scipio, and as many more as you can remember, and yet your essay is purely your personal reaction to the subject. On the other hand, you may make a preliminary investigation into the matter, finding out what scientific writers have said on the subject, quoting your authorities and coming to some general conclusion about the nature and meaning of dreams. Of the first kind, Robert

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## *A Guide for All Students*

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Louis Stevenson's essay on the subject may be taken as an example. Of the other kind, there is no short example, since people do not publish essays of the report type. They are mere exercises, valuable for the training they give, not for the work produced.

A third kind of essay to some extent combines the elements of the first two. This may be called the dialectic or argumentative kind. It consists in the discussion of a question to which there are two opposing answers. Stock subjects of this kind are: Was the English Conquest of India Justifiable? Should Women have the Vote? Is Mars Inhabited? Sometimes the problem is not stated in the form of a question, but the question is implied all the same. If we have the subject of The Character of Cromwell, or The Political Work of Abraham Lincoln submitted for treatment, we know that there is the implied challenge of another side, whichever view we take up. In all essays of the dialectic type the personal element enters largely, but the research element is not to be eliminated. Whichever view we adopt, we have to collect arguments in favour of it and against its opposite. It is curious to note how students naturally divide themselves into two classes according as the research element or the personal predominates. The great majority are under the influence of the personal element. The common case is that of the student who looks at the question for a few minutes, makes up his mind which side he is

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## *Making the Most of One's Mind*

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on, and then proceeds to hunt for arguments for that side. This is quite a good way of going to work so far as the mere exercise in composition and writing is concerned. It is further an excellent training in advocacy. From this point of view it is not infrequent for teachers to prescribe a particular side to be maintained by a student whether he is really on that side or not. The justification of this is that it is often a means of getting a student to see with greater clearness the "other side."

The research method, on the other hand, would have the student start on the debatable question with a perfectly unbiassed mind, seek out all the arguments available on both sides, and ponder these carefully. When every available source of evidence has been exhausted, the student balances all the facts, and decides on the one side or the other. It should be a point of honour to come to a definite conclusion. This last consideration is of importance to only a small class of students. Most of us are only too prone to come to a definite conclusion very early in the investigation, and cling to that conclusion, even against a considerable amount of hostile evidence. But, on the other hand, there are people with such a tendency to hesitate between two opinions that they can hardly ever make up their minds on a really debatable point. On a purely academic matter, such as the sanity of Hamlet, a man may hold suspended judgment throughout his life without sin. But there are other matters, say

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## *A Guide for All Students*

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Woman's Suffrage, on which we must make up our minds one way or the other because we have to take some sort of action. In order that we may be able to make up our minds definitely in cases where a decision is imperative, it is well to acquire the habit of bringing all discussions to a definite positive conclusion.

You must not be misled by the plea of the creditable desire to see both sides of the question. You are entitled to a sight of all there is to be seen; but you are not entitled to sit down and contemplate both sides indefinitely. Among the old Greeks there was a law that made it imperative for the voter to take sides: he was expected to give both sides full consideration, but he was compelled to decide for one or the other at last. Our advice here is to apply in a practical way the law of the excluded middle. Put yourself in the place of a jurymen: he must make the prisoner out to be either guilty or not guilty. No doubt if he has the good fortune to be a Scotsman and at home the jurymen has a loophole. He may bring in a verdict of Not Proven. But this loophole is only the result of Scots caution, and Scots love of logic. The Scotsmen know that the prisoner is either guilty or not guilty, but they don't know which. In certain cases they do know that the charge against him has not been proved satisfactorily, so they give the prisoner the benefit of the doubt. Wherever anybody else's interest is involved it is an excellent plan to adopt the Scots subterfuge.

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## *Making the Most of One's Mind*

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But where it is a matter of intellectual decision, have the courage to determine one way or the other. It is an excellent tonic to have to make up your mind definitely: it gives all the arguments a certain sharpness when a point is reached at which they are to produce a definite decision. So long as you are not dealing with other people's money, rights or feelings, you must be prepared to risk a little by coming to a conclusion. You may be wrong, no doubt, but a wrong conclusion honestly reached after careful inquiry is better than a wobbly halting between two opinions. Let your dialectic essay then finish with a summing up and a verdict. There is no harm in keeping an open mind so far as future evidence may be concerned, but at the end of your essay you ought to have the courage of your conviction.

Very often, however, the so-called research method leads to a mechanical result. The problem is stated in the form of a question, and the working out is largely a matter of statistics. Suppose, for example, the problem is set Whether does the American boy or the German boy spend more time in school during the year? As a matter of fact we all know perfectly well, before we start our investigation, that the German boy will come out ahead. Still, when a research has been instituted, and by a comparison of time-tables and school schedules it is found that the American boy spends from 900 to 1,000 hours in school each year, as against the German's 1,400 hours, and 185 to 200 school days

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## *A Guide for All Students*

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as against the German's 270 school days,<sup>1</sup> we feel that we have made an advance.

Research, however, should risk a little more than this. It should include not only the collection of statistics, but the discovery of the meaning underlying the statistics. Suppose, for instance, that you have an essay prescribed to you on *The Influence of School on Men who attain Distinction*. You could, no doubt, make up your mind on the subject, and give a few examples that you happen to remember, so as to back up what you say. But here you have an excellent opportunity for a little bit of research. First of all you will look up all the books you happen to have of your own, dealing with the biographies of men of distinction. You will not re-read them, but merely glance at the introductory part in each case, to see what reference is made to their schools. After noting the results, you will next go to whatever reference library you have access to and consult many more books in this desultory way. Probably this will be all that you are able to do if the essay is an ordinary part of your work. You cannot afford more time. The results of even this small research will probably rather disquiet you, for you will likely find much less about the schools than you had expected. The effect of this should be to make you cautious in laying too much stress upon the influence of the school, for absence of evidence may in itself indicate a fact that you had not anticipated.

<sup>1</sup>*Educational Review* (American), April, 1914, p. 428.

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## *Making the Most of One's Mind*

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If now you had time and wanted to make a genuine research, you might arrange with some of your class-mates to go through a systematic search of the lives of great men. This could be done comparatively easily, since there is an important work, *The Dictionary of National Biography* that runs to twenty-two<sup>1</sup> volumes and contains over 30,000 biographies. If you and your friends divided up the volumes, you could arrange that each should be responsible for one volume. All that would be necessary is to examine the beginning of each of the biographies and note all those cases in which there is a direct reference to the school, noting further whether the reference is favourable to the school or not. In this way you would find the number of cases in which there is no reference to school at all, and the number in which there is such a reference as shows that the school has exercised either little influence, a good influence, or an evil influence on the great men. Such an investigation has not yet been made, so there is an opening to your hand for a co-operative research, that might lead to useful results.

At the present time there is a tendency to over-rate research for its own sake. It is quite possible, with a good deal of patience, to discover the exact number of times the letter *e* is used in *Hamlet*. This is research: it is also waste of time. It is not justifiable even as an exercise, for the same practice

<sup>1</sup>The original edition has sixty-three volumes, with four supplementary volumes.



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## *A Guide for All Students*

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could have been obtained in carrying out a research that, even if it does not reveal anything new, at least confirms what is already known, and makes the researcher *realize* what he knew before only in a vague way, and on the evidence of others. We all know in a general way that Milton uses a higher percentage of Latinized words than does Defoe. But if we take the trouble to select two thousand words consecutively from any part of the *Areopagitica*, and two thousand words consecutively from any part of *Robinson Crusoe*, and classify the words as (1) Latinized, (2) Saxon, and (3) those neither Latin nor Saxon in origin, we get a quantitative result from which we can say with greater exactness how the two vocabularies stand to one another. Results of this kind very often surprise the investigators: nearly always they suggest facts that had not before been suspected.

A particularly useful exercise at the early stages of your practice in research is the verification or testing of results obtained by others. The advantage of this exercise is that you have a sort of standard by which to judge whether you are keeping fairly near the truth. If your results are widely different from those of your predecessor, you have the alluring hunt for the big error you have made, with, of course, just the delightful possibility that the error was made by the other fellow.

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## CHAPTER X

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### EXAMINATIONS

**I**N the first chapter of the second book of Dickens' *Our Mutual Friend* we have the following account of an elementary schoolmaster, Bradley Headstone by name:

"From his early childhood up, his mind had been a place of mechanical stowage. The arrangement of his wholesale warehouse, so that it might be always ready to meet the demands of retail dealers—history here, geography there, astronomy to the right, political economy to the left—natural history, the physical sciences, figures, music, the lower mathematics, and what not, all in their several places—this care had imparted to his countenance a look of care; while the habit of questioning and being questioned had given him a suspicious manner, a manner that would be better described as one of lying in wait. There was a kind of settled trouble in the face. It was the face belonging to a naturally slow or inattentive intellect that had toiled hard to get what it had won, and that had to hold it now that it was gotten. He always seemed to be uneasy lest anything should be missing from his mental warehouse, and taking stock to assure himself."

Here we have a scornful account of the state of mind

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## *A Guide for All Students*

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produced by an excessive attention to examinations. But we are not to be misled by Dickens' contempt into thinking that examinations are necessarily bad. It is, no doubt, wrong to adopt the view that the mind is a mere storehouse and that knowledge is to be regarded as nothing more than the stock of a retail or even a wholesale shopkeeper. But it is quite a sensible thing to take stock now and then of our mental content, not only to see that there is nothing missing, but to make sure that what is present is arranged in the most satisfactory way. We have seen that the best way to remember things is to keep turning them over in our mind, and reviewing them in their proper relations to each other. This is obviously a form of examination conducted by ourselves. It is really a part of our education, and a very important part.

The same sort of work can be done for us in our regular studies by more or less formal examinations conducted by others. We are too apt to regard examinations merely as tests. No doubt this is often the function that is emphasized by all concerned with them. But we are not to forget that they have also an educational function. They form an essential part of our education, and if properly used are very helpful in our studies. If you have ever gone in for a serious examination involving a considerable amount of preparation, you have, no doubt, had an experience something like this. Just about three weeks before the examination is due, you have had

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## *Making the Most of One's Mind*

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the curious feeling that you are beginning really to know the subject, and if only you had other three months instead of three weeks you could truly master it. The cause of this feeling is that towards the end of your long preparation you are revising a good deal of the work you have previously done. Accordingly, you are dealing with much larger slices of the subject at a time than you have been accustomed to during your ordinary preparation. The result is that you have perforce to take wider views, you see things more in their relation to the whole, you begin to have a glimpse of the meaning underlying that whole. As you thus begin to appreciate the general principles underlying the detailed knowledge you have acquired, you inevitably tend to organize your knowledge and thus to experience a feeling of mastery that mere details cannot give.

Preparing to work an examination paper to be set by another person is itself a sort of examination of ourselves conducted by ourselves. The advantage of having a paper set by some one else is that we have to take into account the possibilities of questions being set quite other than those we have been setting to ourselves. We are all apt to get into a groove: we deal with aspects of our studies in which we are specially interested. But when we know that our work has to stand the test of questions set by a person who may not share our view about the interesting points, we have to take a wider sweep, and try to get a true estimate of the relative importance

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## *A Guide for All Students*

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of facts, apart altogether from our own particular preferences.

When examinations are regarded as tests, they follow two lines. Some of the questions are intended to test merely whether the student knows certain things. Here the point is whether the student can reproduce what he has learnt. This is the lower kind of examination, and does not rise above the level of Bradley Headstone's mechanical stowage, and mental stocktaking. Other questions, however, are set on the principle of getting the pupil to apply the knowledge he has acquired. The student may know all the facts necessary to solve a given problem and yet be unable to solve it. On the other hand, if he can solve the problem, he has given proof that he knows the facts on which the solution depends. It would seem, therefore, that all examination questions should be such as involve problems, for if the pupil can apply knowledge, it proves that he possesses knowledge.

But it is felt that certain pupils may have acquired knowledge without having the ability to apply it, and that, therefore, there ought to be a certain number of questions in every examination paper for the benefit of those who have honestly acquired knowledge that they cannot successfully apply. It is maintained that the examination may be used to test the industry of the candidate as well as his ability. It may be very reasonably questioned whether any good end can be served by acquiring

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## *Making the Most of One's Mind*

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knowledge that we confessedly cannot use, but this problem has to be solved by those who are responsible for the drawing up of examination papers. Our interest in this book is how to help the student to deal most advantageously with examinations as they are. It is almost certain that at some time or other you will have to face an examination of some kind, and it is therefore to your interest to consider how you can best prepare for that examination.

(1) The first thing to be done is to find out as much as you can about the exact nature of the particular examination that you must face. From one point of view it is rather a fine thing to despise examinations and give your whole attention to your studies. If we work up our various subjects in the best way, we are entitled to expect that the examination will fit into what we have done, and to complain if the examination results do not favour those who have studied in the best way. All this would be just and proper if examinations were ideal. But unfortunately this is not the case, and if the passing of an examination is of importance to you, it will be to your interest to take the proper means to acquaint yourself with its conditions. To prepare for an examination that is not conducted on the best lines may in some degree interfere with your mode of preparation, and may make you to some extent depart from your ideals. But as a rule skilful preparation for a given examination may be combined with a satisfactory scheme of mastering the

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## *A Guide for All Students*

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subjects studied. A good deal will depend upon whether the examination is competitive or merely a pass one. If you have only to reach a fair pass standard you will usually find that you can attain what you want without seriously modifying your plan of study. Such examinations can be "taken in your stride"; i. e., you can go on with your studies in your usual way and just give a little brush up before the examination actually takes place. With competitive examinations, on the other hand, when it is necessary to squeeze out of the examiners every possible mark, it may well be that you have to adopt quite a special line of study preparing for the examination, rather than studying your subjects for their own sakes.

This putting of the examination in the first place is in itself radically bad. The examination should be a means and not an end. If, in the ordinary work of a school, the examination at the end of the year dominates all the work of the year, there is something wrong. The cart is being put before the horse. The principle is educationally unsound. But in the case of a competitive examination, the result of which is to determine a scholarship or a post in the Civil Service or elsewhere, it is not a matter of education at all, it is a matter of economics.

But even an ordinary pass examination at the end of a school or college term deserves attention to the extent of your finding out its exact nature. I have come across many cases of young people

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## *Making the Most of One's Mind*

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doing a year's work, at the end of which they were expected to take the Intermediate examination of the University of London, without ever having examined the requirements in the different subjects. This did not result from a lofty view of the dignity of well-directed study, and a contempt for the restrictions of mere examination requirements, but from sheer indifference and lack of interest. These young people did their work from day to day as prescribed by their teachers, and thought that this was all that was necessary. The first thing these young people should have done was to get a copy of the syllabus in each of their subjects, and familiarize themselves with the field they had to cover in their studies during the year.

(2) In all cases where a printed syllabus of work is available it should be compared with the textbooks that you are studying. If anything appears in the syllabus that does not appear in the contents or index of your textbook, you must make it your business to supply the missing information. This is particularly necessary in the case of technical terms. If you are attending a class in the subject, it will probably be enough if you make a note of any such omissions, and then keep a careful eye upon this note during the session. If the lacking piece of information does not make its appearance in your notes of lectures, then it will be necessary to make inquiry from your teacher, within a reasonable time of the date of the examination.



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## *A Guide for All Students*

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(3) In some cases, particularly in scholarship examinations and some of the higher civil service examinations, there is no published syllabus. The candidate is faced with the bald statement that he will be examined in, say, English, Greek, Latin, Mathematics, and Physics. In such cases it is usually possible to procure copies of former examination papers. If you can get hold of the papers for a few years preceding the date of your own examination you will be able to form a serviceable idea of the nature and scope of the examination. But there is a strong, and not altogether illfounded, prejudice against using old examination papers in preparation. The usual objection is that those who adopt this method are really placing the examination in an altogether too commanding a position in relation to the real work of education. But here again the same considerations come in as in connexion with the question of examinations in general. If we were dealing with a class test or an ordinary non-competitive examination, there is no doubt that a study of the old papers would be undesirable. But where there is competition there should be equality of advantages. Of two candidates preparing for the same examination, the one who has used old papers has a very great advantage over the one who has not. It is for this reason that in connexion with certain examinations every effort is made to prevent the publication or distribution of the examination papers. But the result is usually that certain unscrupulous

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## *Making the Most of One's Mind*

---

persons obtain old papers, and thus get an illegitimate advantage. It would be fairer all round to publish the papers and let everybody have the same chance.

Granting that the use of old papers is justifiable, the question remains of how to make the best of them. Students sometimes make the serious mistake of merely glancing over old papers and saying to themselves, "Well, I could do numbers 2, 3, 5, 6, 9 easily, numbers 1, 7 and 10 fairly well, but numbers 4 and 8 I couldn't do at all." This general impression is of little use. What is wanted is that you should sit down and work out the paper as a whole under examination conditions. This means that you must set apart three hours, or whatever the regular time is, and sit down and work out the paper as if the examiner were in your room. In this way you will learn a great deal. To begin with, you will almost certainly find that the questions you thought you could easily "polish off" have much more fight in them than you had expected. Then you will probably find that you have miscalculated the time, and at the end you have to hurry over matters that you know to be important. The real fact of the matter is that while working examination papers is supposed to test general intelligence, it really tests mainly the power to write examination papers. To do examinations is a business like any other, and has to be learned. An experienced writer of examination answers will get far more value out of the ex-

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## *A Guide for All Students*

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aminers than one who has no experience of working papers but has the same amount of knowledge of the subject as his more experienced rival. The important point for you to remember is that of two candidates of equal experience in writing examination papers that one will have the advantage whose experience has been gained in papers that most closely resemble the paper in question. Enough has been said to show the importance of practising working out the very sort of papers likely to be set, and that under precisely the conditions that will obtain at the real examination.

(4) More doubtful is the advice sometimes given to make a study of the personality of the examiner. The doubt, it is to be noted, is on the moral side. There can be no question of the *advantage* of a knowledge of the peculiarities of an examiner who is to set and mark your papers. The question is whether it is justifiable that candidates should seek for and utilize this information. Probably the matter can be best compromised by regarding as legitimate the use of any public facts about the examiner. A glance at *Who's Who* may give you a hint or two that are open to the whole public. If he has written books on the subject, it is surely legitimate to consult them, and make whatever application your intelligence suggests.

(5) The zone of real danger is approached when we consider the calculation of the probabilities of particular questions being set at a given examination.

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## *Making the Most of One's Mind*

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Here we are introducing the sporting element, and backing our guesses by paying particular attention to the sort of questions that we expect to be set this year. Certain cramming institutions have carefully prepared tables showing the chances of particular questions being set at certain examinations. The element of the real importance of a question is dwarfed in view of the recency of its appearance on an examination paper. It may be safely said that all considerations of this kind may be very wisely neglected by the honest student. He should be always ready for any of the "stock" questions that may be set, whether they appeared last year or ten years ago. To be really prepared for the examination implies the power of dealing with any of the stock questions, and for any peculiar question it is neither possible nor desirable to make preparation. Such questions owe their value to their power of testing the capacity of the student in dealing with unexpected matter.

(6) In the actual working out of an examination paper in the examination hall some hints may be of use. To an experienced examinee what follows will no doubt appear very elementary, but we must consider the case of the less experienced. Taking it for granted that the immediate purpose of the examinee is to extract from the examiner the greatest possible number of marks, we have to work on the very humble plane of utility, and consider how this end can be best attained.

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## *A Guide for All Students*

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(a) *Come to an examination with a well-rested body and brain.* This is a rule that the best students find it hardest to observe. There is a class of students that have no difficulty in avoiding the adding of brains that necessarily follows on the late sitting of the night before an examination. But your genuinely anxious student can hardly be convinced that it is folly to cram up a few more facts at the expense of the general vigour of all his answers. Do not be misled by the remark common among students that if they had not ground away far into the early hours they would not have been able to answer this or that question. No doubt it sometimes happens that a student has re-read at his late sitting the answers to some of the very questions that meet him next morning. To begin with, this is only a chance, and cannot be relied on: while the general muddleheadedness and lassitude are certainties. Again, while the chance help affects only one, or at most two, of the questions, the general weariness affects the whole paper. You will be well advised to go to bed early on the evening preceding an examination and to be in the examination hall at least ten minutes ahead of the time for the paper.

(b) *Consider, the evening before, what you have to take with you to the examination hall.* In some examinations everything is provided in the hall. But even if ink is provided you will be well advised to take your own pen with you. A pencil is always convenient, and if you have practical work of any

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## *Making the Most of One's Mind*

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kind to do it is well to have with you whatever instruments you are allowed to bring. It frequently happens that one's own instrument adds materially to one's courage at an examination. One article should never be left behind. The clock in the examination hall is not always visible to all the candidates. Besides, it is sometimes wrong. You must run no risk of finding out at the end of the time that when you thought you had half an hour you have only a quarter. A watch—a watch that will go—is an essential part of your examination-room equipment.

(c) *Read your whole paper and note whether it is printed on both sides.* Few candidates read their papers with anything like the care that those papers deserve. Frequently they come away happy, only to discover when the paper is beyond recall that it contained some important remarks on the other side. The cause of the common blunder is not far to seek. Questions are long and time is fleeting. Time must be saved at all costs, and the foolish candidates begin to economize at the wrong end. Let them consider the remark of a distinguished surgeon to his assistant who was eager to lose no time: "In cases of this kind the surgeon has no time to be in a hurry."

Connected with this rule is the problem whether a candidate should read all the paper at once before beginning to answer any questions, or should start right away with the first question he can face. It is sometimes argued that by reading over the whole

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## *A Guide for All Students*

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paper the candidate gets discouraged, and cannot do well even what he knows, through the shock of discovering how much he does not know. While it must be admitted that for the ordinary student there are few more depressing documents than sheets of examination questions, it seems an ostrich-like way of meeting the difficulty to avoid seeing it as long as possible. Every experienced examinee will tell you that at the beginning of an examination the nerves are hardly in a condition to carry out the orders of the brain, even when the brain knows precisely what to order. The time spent in studying the paper as a whole encourages the nerves to settle down to steady work. Besides, everyone with any experience knows that the first sight of the examination paper almost always has a paralysing effect that produces the feeling that the paper is an impossible one, and that failure is staring the reader in the face. The time spent in considering the paper as a whole gives this feeling leisure to fade, for there are few papers that do not present some foothold for even incompetent candidates. The final reason for reading over the whole before putting pen to paper is that our next rule becomes an impossibility unless this be done.

(d) *Plan out generally the time that you can allow for each of the questions that you propose to answer.* There must be nothing slavish in this. Eight questions in a two-hour paper give a comfortable quarter of an hour for each, with no time for revision; but

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## *Making the Most of One's Mind*

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it is always well to leave a few minutes free for re-reading your answers just before you hand in your paper.

In a three-hour paper there would be twenty minutes to each question with twenty minutes over for revision. But if one of the questions demands an elaborate analysis of a standard English Classic, while another will be content with the enumeration of a dozen English authors, a new element is introduced. But even after you have made a rough and rapid allocation of time to the different questions, you must not be too much tied down by it. On trial a certain question may prove to be more difficult than you thought. In this case you had better leave it unfinished, and go on to the next, leaving a space sufficient to hold the rest of the answer if your hope is fulfilled that there may be one of the other questions that balances matters by proving not so difficult as you had imagined.

But even if you do not find it possible to return to the unfinished answer, you have acted not un- wisely in leaving it. For I am now going to say a rather heterodox thing. All our moral books din into our ears that *one thing at a time and that well done* is the true rule of life and the only pathway to success. I am not going to deny its truth in general—but in examinations it does not work. Leaving out of account the moral question, and considering merely the best way of extracting the greatest possible number of marks out of the examiner, it will



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## *A Guide for All Students*

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be found that in an examination two half-answers are better than one whole one. There is an element of wisdom in the Irishwoman's method of buying her pound of tea by ounces, because she got "the turn of the scale every time."

To begin with, it has to be remembered that an examiner—except in the case of arithmetic and one or two of the exact quantitative sciences, where the principle does not hold—almost never gives the full marks for any answer, however well done; while a half-answer readily, and apparently justly, gets half-marks. If a candidate makes some correct remarks on a subject the examiner feels called upon to give some credit for them, and that credit is usually much greater than would be given for the same amount of time spent on elaborating a fair answer into an excellent one. For every candidate must have observed that the beginning of an answer is usually much easier than the ending. You remember easily the big important facts, and these rightly carry the bulk of the marks; but to put in all the fine details demands more knowledge, time and ingenuity than are always available. You can pour out a pot of honey in a few minutes or even seconds, but if the pot must be completely emptied in order to secure full payment, it seems likely that the additional time might be more profitably spent. Therefore make sure that you leave no compulsory question unattempted, even though you do not feel able to give a full and accurate answer.

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## *Making the Most of One's Mind*

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It may be well to add that these considerations are applicable mainly to public examinations conducted on a large scale by external bodies. In class examinations and in examinations intended to test ability rather than mere attainment other standards maintain. One really excellent answer may be accepted by the examiner as counterbalancing any number of half worked out but fairly accurate answers. You must therefore take into account the kind of examination at which you are sitting, and make up your mind beforehand whether you are going to rely upon a thin spread of knowledge, or a concentration on what you really know well, and a neglect of the rest.

*(e) If there be a choice of questions, select those of which you are quite sure you know the answers.* This is another rule that candidates find it very hard to obey. You may even accuse me of inconsistency in laying it down. You may say that it does not agree with the rule in *(d)*. For I am now saying that a perfectly answered question brings more marks than one imperfectly answered. But the cases are not parallel. You may have observed in your experience that when you are not sure about a question it almost invariably turns out that you do *not* know what you were doubtful about. An answer of which you are not sure generally contains things you would rather have left unsaid, and it is precisely such remarks that reduce percentages of marks. Certain mistakes have the effect of not only

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## *A Guide for All Students*

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not making marks, but of causing the withdrawal of marks legitimately won in other directions. When an answer is one-half right and the other half nonsense, the examiner is inclined to say to himself: "The blockhead who can make such blunders in one part of his answer, probably does not understand even what he has happened to put down correctly." So that it often comes out that half right and half wrong does not get fifty per cent, but only twenty-five. This may not be quite fair, still we are not here talking of fairness, but of how to gain marks, and the best way to gain marks is to choose the questions that we are sure of.

Further, it is worth your while to consider this point that the more difficult you find a question the more important you are apt to think it. What seems easy to you may be, from the examiner's point of view, more important than what gives you trouble. In certain examinations the number of marks allocated to each question is printed at the side. In such cases there is commonly much surprise among the candidates at the high marks given to certain questions that appear to them to be easier than certain others that carry much lower marks. This should strengthen you in your determination to select those questions that appear to you to be most within your powers.

*(f) Every question has a definite point. This point must be discovered before any answer can be profitably attempted.* No doubt questions are frequently

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## *Making the Most of One's Mind*

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put clumsily and ambiguously. They may not really have a point, *but they are all meant to have one*, and it is the candidate's business to find it. This is not the place to grumble at badly set questions. Our business is rather to consider how to deal properly with such inconveniences. If a question is really ambiguous you must choose one of the two meanings, and answer as if that were the only meaning. But be careful to state the difficulty you have had and that you have made the assumption that the meaning you have adopted is the true one. It is worth remembering that if the examiner has been ambiguous he is inclined to make allowances, so you need have no hesitation in adopting whichever of the two meanings happens to be the more convenient for you to answer.

But with an ordinary honest straightforward question this plan of adapting it to your own needs will not work. No one but an experienced examiner can realize the number of cases in which candidates attempt to cover up their ignorance on one point by an excessive display of knowledge on another. Now you may take it as axiomatic that this plan does not work. Even examiners have enough intelligence to insist upon getting what they want. Very probably, however, much of what the examiners complain about is the result not of attempts to throw dust in their eyes, but of careless reading of the questions. One very common cause of the misunderstanding of questions is the expectation that

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## *A Guide for All Students*

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certain questions are likely to be set. The candidate who has prepared with great care and in much detail an account of the war of the Spanish Succession, sees the expected question on the paper and eagerly and voluminously answers it, only to discover when all is over that what the question had to do with was the *Austrian* Succession. In a Government examination for teachers a question was set on the uses to which school libraries could be put in the cultivation of the intelligence and in the teaching of composition. The majority of the answers dealt with the best way of getting up a school library and who should give out the books. These were the matters the candidates expected to be asked about.

(g) *Avoid "shots" at examinations.* We have already considered the place of guessing in the process of study; and the principles we have recognized enable us to come to a definite recommendation with regard to attempting to meet a question by an answer that may be compared to a shot in the dark. The chance of hitting the mark is so infinitesimal as to be negligible, while the result will probably be so ludicrously irrational that it is likely to reduce the value of the rest of the paper. But if the context suggests something to you, it may not be a bad plan to make your shot. Suppose you are asked, "Where is Khvalynsk?" You have never heard of the place before, but you may fairly guess that it is in Russia, and answer accordingly.

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## *Making the Most of One's Mind*

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The following is a typically honest "shot." The candidate was asked to explain the term *Landskip*, as found in Milton, and to give its derivation.

"This appears to be another form of what we now call a *landslip*, in which the land, on account of the slipperiness of the stratum underneath it, begins to slip down the hill. If it slips very fast it may be said to *skip*—hence the name. I have never seen this word before."

This candidate lost nothing by this ingenious guess, though, of course, he gained nothing, since he did not know that *landscape* is derived, according to one dictionary at anyrate, from an older form, *landshape*, though others say it really is another form of *landschap*, which means *landship*, and may be compared with the German *landschaft*.

Of course, it goes without saying that you will never make a shot at what you do not know, if there is any choice of things you *do* know; and if you do make your shot, you will do it with an indication of your data. It is perhaps in the translation paper that the temptation to make shots is greatest, and yet there the intelligent student with a feeling for language has a fair chance of success. The context is often so suggestive that it is not difficult to hit upon the necessary word. In cases of this kind it is not essential to declare that you have made a shot. The fact proclaims itself, and on the other hand the exercise in unseen translation is a sort of legalized shot-making. It is really an invitation to

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## *A Guide for All Students*

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use all the knowledge you possess in order to discover a meaning that is hidden by your ignorance of certain words. If the passage is taken from a book which we are supposed to have prepared, the licence to shoot is no longer available, and if we shoot we must proclaim the fact and take the consequences.

(h) *Be sure that you take full advantage of any information that the examination paper itself supplies.* Even in such a trifling matter as spelling there is often help to be had from the printed paper. Candidates are sometimes so culpably careless as to misspell a word that actually occurs in the question set. But there are other ways in which one part of the paper may help another. For instance, examiners sometimes ask for illustrations of certain things, and the student has only to turn to some of the other questions to find all he needs. In a paper on English, for example, one question may be to give examples of various figures of speech, and another to specify which author is responsible for each of quite a large number of quotations. It will be rather remarkable if the intelligent candidate is not able to find among the quotations all the examples he needs. A really skilful examiner makes sure that his paper does not play in this way into the hands of the candidates; but then the supply of really skilful examiners is not in excess of the demand.

(i) *Read over each question when you have fin-*

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## *Making the Most of One's Mind*

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ished it, but if you have any time left at the end of the whole paper, you will find it well spent in re-reading all your answers. You will sometimes be amazed at the mistakes you find, mistakes that you would not have believed it possible you could make had you not seen them actually lying there before you in your own handwriting. The last thing you should do before handing in your papers is to see that the proper number of the question is placed before each answer, and that your own name and any other indications are placed where they ought to be. This last is merely a special precaution, as every experienced student knows that his *first* business in dealing with his examination answer book is to fill in his name and other particulars.



# INDEX

## A

Absorption, 129  
 Addison, 173, 255  
 "Allusive" writers, 196  
 Alsted, Johann Heinrich, 202  
 Alternative, fixing of the, 79  
 Analogy, 105  
 Analysis of Chapter IV, 237  
 Analytical note-taking, 229  
 Appeals for subject matter, 209  
 Apperception, 89  
 Area of attention, 132, 133  
*Areopagitica*, 263  
 Aristotle, 179  
 Armstrong, Professor Henry E., 150  
 Arnold, Felix, 222  
 Ascham, Roger, 17, 18, 19, 157  
 Assimilation, 89  
 Associative listening, 217  
 Attention, classification and manipulation of, 123  
     Rhythm of, 130  
 Attitude, the potency of, 116  
 Audiles, 24, 25

## B

Baedeker, 220  
 Bennett, Arnold, 162  
*Bible*, 173, 200  
 Bibliographies, 208  
 Bi-polar process in lecturing, 214  
 Blake, William, 28  
 Block system, 71  
 Bookishness, 155  
 Books of reference, 188  
 Bookworms, 156  
 Bounder, 28  
 Brain, upper and lower, 12  
 Brewer, Dr. E. C., 197  
*Britannica Encyclopædia*, 203, 204  
 Browning, 38, 165  
 Browsing, 172  
 "Brute" Memory, 61, 73  
 Buffon, 116  
 Burke, 150, 173

## C

Calculation of probabilities at examinations, 273  
 Careless reading of examination questions, 282  
 Carlyle, 180  
*Chambers' Encyclopædia*, 203, 206  
 Cholera, 21

Clarke, Mrs. Cowden, 200  
 Committing to memory, 67  
 Complete detail method, 56  
 Conceit, 25, 27  
 Concentration beat, 131, 215  
     Range of, 132  
 Concordances, 199  
 Conscience, 44, 45, 49, 113, 174, 182, 187  
 Co-operative study, 111  
 Cranmer, 3  
 Cromwell, 148  
*Crusoe, Robinson*, 226, 263  
 Curve of fatigue, 48, 49

## D

D'Alembert, 139, 140  
 Dante, 223  
 Dative in Latin, 76  
 Deductive thinking, 100  
 Defoe, 263  
 Desk table, 114  
 Dialectic compositions, 257, 260  
 Dickens, 264  
 Dictation in lecturing, 228  
 Dictionaries and their uses, 189  
     English-foreign, 190  
     Rhyming, 197  
     Size of, 193  
     Supplementary dictionaries, 196  
 Dictionary, 168, 169, 171  
     Definition of, 200  
     Distinction from encyclopædia, 202, 203  
 Difference of opinions, cause of, 95  
 Difficulties, how to deal with, 137  
 Diffusion beat, 130, 216  
 Drummond, Professor, 149

## E

Early rising, 114  
 Educand, 6  
 Educand to educator, 7, 32  
     Combination of educand and educator, 146  
 Educator, 6  
     External, 6  
 Elimination of external educator, 6  
 Elizabeth, Queen, 18  
 Empirics, 106  
 Encyclopædias, 202  
     Use of illustrated, 205  
 Ends and ideals, 39  
     Ends, need for clear, 122, 151

# Index

English-Latin dictionaries and their use, 191

*Ennui*, 53

Essay writing, 251

Essays as class exercises, 256

*Euphuus*, 18

Examination as revision, 265

As test 267

Examination syllabuses, 270

Examination work, 92

Examiner, personality of, 273

Examiners as lecturers, 229

Expression, 84

## F

Fabre, J. Henri, 29, 31, 140

Fact into faculty 84, 136

Failure, temporary, 140

Fatigue, 45

Pathological form of, 54

Fatigue curve, 48

Fatigue-producing effects, 52

Form and matter in composition, 254

Foster, 255

Free translation *versus* literal, 242

Freedom, 8, 31

Fröbel, 84

Full marks at examinations, 281

Fumbling, 107, 151

## G

Gaping point, the, 143, 151

Goldsmith, 39, 173, 255

Gravitation, law of, 85

Gray, 70

Grey, Lady Jane, 18

Guessing, 93, 98

## H

Hamilton, Sir William, 228

*Hamlet*, 262

Hard Wits, 20, 57, 157

*Harmsworth's Encyclopædia*, 204, 206

Headstone, Bradley, 264, 267

Hearing distinguished from listening, 213

Henry VII, illustrative study of, 117

Herder, J. G., 159

Heuristic method, 149

Hints for the actual working of examination papers, 274

Home study, 36, 40

Humours, 21

Huxley, 234

Hypothesis, 99

## I

Ideals, 38

Ideas, 86

Impression, 84

Inattention, 123, 216

Index, 186

Index to encyclopædia, 204

Inductive thinking, 100

Inference, 107

Inference stage, 141

Instalment system of memorizing, 66

Instruction, meaning and application, 218

Intercourse, 24, 25, 154, 155, 166, 178, 188, 189

Interest and its manipulation, 126

Introspection, 14

## J

Jacotot, 29

Jesuits on lecturing, 228

Johnson, Dr., 169, 255

## K

Kempsies, 52

Kipling, 198

Knowledge, three ways of acquiring, 24

Active and passive, 85

## L

Lamb, Charles, 254

Latin prepositions, 77

Laurie, Professor, 30

Laws of thought, as thought, 94, 99

Le Bon, Gustave, 11

Learning by *rote* or by heart, 67

Lecturer's notes in relation to student's notes, 236

Lectures as a means of communicating knowledge, 224

As distinguished from chapter in textbook, 225

Inspirational or didactic, 217

Lecturing, bi-polar, 214

Lecturing distinguished from teaching, 214

*Lernfreiheit*, 32

Lip movements in reading, 158

Listening distinguished from hearing, 213

Listening intermittent and rhythmic, 215

"Projection" in listening, 216

Locke, John, 96, 98, 209

Long-hand note-taking, 228

Looking before and after, 134

Loose sentence in lecturing, 226

Lotze, Professor, 22

## M

Macaulay, Lord, 170

Mackay, Dr., 75

Manipulation of time at examination, 277

Map of England, 121

Marking books, 175

Mathematical limit, 38, 39

Melancholics, 21

*Memoria technica*, 74

# Index

Memories, kinds of, 24  
 Memory, effect of clean living on, 61  
 Improvement of in a certain direction, 65  
 Index of, 62  
 Management of, 60  
 Rational, 72  
 Training of, 73  
 Verbal, 72  
 Mental content, 85  
 Mental second wind, 54  
 Mental stock-taking, 265  
 Milton, 70  
     His vocabulary, 167, 264  
*Mnemonic*, 18  
 Mnemonics, 75, 81  
 Montaigne, 68  
 Moreri, Louis, 202  
 Motors, 22  
 Murray, Sir James A. H. 195

## N

*National Biography*, the dictionary of, 262  
*New international encyclopædia*, 207  
*Notes*, 77  
 Note-making and its forms, 223  
     (a) Verbatim, 223  
     (b) Long-hand, 227  
     (c) Unsystematic or topical, 229  
     (d) Analytical, 231  
 Novel reading, 153

## O

Objective self, 4, 17  
 Obliviscence, index of, 63, 222  
 Observation, 24  
     Observation stage, 142  
 Old examination papers, 273  
*Oratoriæ Institutiones*, 19  
 Organization of lecture, 234  
 Over-fatigue, 46  
 Over-pressure, 45

## P

Partnership in study, 111  
*Pecher*, 80  
*Pecher*, 80  
 Periodic sentence in lecturing, 226  
*Philekoos*, 19  
*Philepaios*, 19  
*Philomathes*, 18  
*Philoponos*, 18  
 Phlegmatics, 21  
 Pierce, Gilbert A., 200  
 Plato, 18, 179  
 Poets, two kinds of, 165  
 "Point" of an examination question, 281  
 Point of view in composition, 253  
 Practical thinking, 107  
 Practice-effect, 47

Practice in note-taking, 233  
 Preaching, 214  
 Preferences of students, 24  
 Preferred sense, 23  
 Premises, 100  
 Preparation for examinations, 268  
 Priggishness, 27  
 Private student, the, 56, 112, 154, 183, 185  
 Problems, 91, 267  
     Recognition of, 138  
     Three stages in dealing with, 140  
 Professors and students, 179  
 Progress between lessons, 43, 66, 67  
 Purpose, in listening, 213  
     In reading, 173  
     In seeking knowledge, 91, 173

## Q

Quick wits, 20, 57, 157  
 Quintilian, 19

## R

Raleigh, Sir Walter, 218, 221  
 Rapid impression method, 56  
 Rational memories, 23  
 Reading, 24, 25  
     Desultory, 171  
     General, 170  
     Leisurely, 164  
     Lip movements in, 158  
     Marking books in, 175  
     Mechanism of, 156  
     Possibility of increased rate of, 162  
     Rate of, 157  
     Relation between speed and accuracy of, 163  
     "Silent," 159  
     To acquire tone, 173  
 Real living, 13  
 Reflexion, 3  
 Reflexive verbs, 3  
 Reports, 256  
*Republic*, *The*, 17  
 Research, the beginnings of, with illustration, 210  
     The research method, 258, 260  
 Rhyme and rhythm in mnemonics, 77  
 Rhyming dictionaries, 197  
     Geographies and histories, 7  
*Robinson Crusoe*, 226, 263  
*Roget's Thesaurus*, 190  
 Room-sharing, 111  
 Rousseau, 150  
 Royal road to learning, 34, 138  
 Ruskin, 234

## S

Sanguines, 21  
 Scaffolding, 76, 77, 81, 82, 136  
 School *versus* College, 32  
*Schoolmaster*, *The*, 17, 20  
 Scott, 164

# Index

- Self, subjective and objective, 4, 7, 10  
 Self-consciousness, 10, 11, 14, 26  
 Self-educated, 28, 33  
 Self-education, 28  
 Self-esteem, 16  
 Self-examination, 10, 14, 17, 26  
 Self-expression, 8  
 Self-questioning, 149  
 Self-realization, 8, 16, 17  
 Self-reference, 15  
 Selfishness, 15  
 Sensories, 22  
 Shakespeare, 134, 171  
     His vocabulary, 168  
 Shelley, 134, 166  
 "Shots" at examinations, 283  
 "Silent" reading, 159  
 Size of dictionaries, 193  
     Of encyclopædias, 203  
 Skeat, Professor W. W., 167  
 Skipping, 173  
 Smith, Dr. Walter C., 154  
 Socrates, 147, 148  
 Socratic irony, 147  
 Socratic method, 145  
 Solon, 16  
 Spencer, H., 84  
 Steele, 225  
 Stevenson, R. L., 257  
 "Stock" questions at examinations, 274  
 Stock-taking, personal, 17  
*Student's Manual, The*, 137  
 Student, the private, 56, 112, 154, 183, 185  
 Student's attitude towards lecturing, 217  
     Notes in relation to lecturer's notes, 236  
 Students, external, 154  
     In relation to assimilative and constructive work, 91  
     Internal, 154  
     Two classes of, in relation to textbooks, 183  
 Study, acquisitive (assimilative) and constructive, 88  
     In relation to physical comfort, 114  
     The test of, 119  
 Study period, length of, 50  
 Style suited for lecturing, 226  
 Subjective, 4  
 "Subjects," 201  
 Swing effect, 47, 49, 129  
 Synonyms, dictionaries of, 199
- T**
- Tactiles, 24  
 Taking stock of oneself, 16, 17  
 Teacher, place of, between textbook and pupil, 180  
 Teaching, distinguished from lecturing, 214  
 Temperament, 20, 116
- Tennyson, 164, 166, 172  
 Textbooks, 24, 165  
     Definition of, 178  
     Distinction from books of reference, 188  
     How to use, 186  
     Origin of, 178  
     Retention of old, 187  
     Two kinds of, according as subject or reader is more prominent, 184  
     Versus teacher, 183  
 Thackeray, 7, 98  
 Thinking, practical, 100, 107  
     The three stages of—thing, law, system, 134  
     Without words, 167  
 Thoroughness, 56, 135, 174  
 Thring, Edward, 116  
 Time, English and American, 81  
 Time-tables, 35  
     Danger of rigidity of, 44  
     Evening, 37  
     Order of subjects on, 42  
 Todd, Rev. John, 137, 138, 139, 143  
*Toga liberior*, 1  
*Toga virilis*, 1, 32, 41  
 Topical (or unsystematic) note-taking, 229  
 Translation, 241  
     Illustrative passage, 246
- U**
- Uccello, 207  
 Unconscious cerebration, 67  
 Unit in learning by rote, 71  
 "Unseen" translation, 242, 245
- V**
- Verbal memories, 23  
 Verbatim notes, 223  
 Visuals, 23, 25  
 Vocabularies, the three, reading, writing, and speaking, 169  
 Vocabulary of the English Bible, an educated Englishman, a Chinese historian, an illiterate peasant, 168, 169  
 Means of enriching, 170
- W**
- Wagner, 52  
 Webster, 195, 200  
 Wells, H. G., 37  
 Whirlwinds, direction of, 80  
 Wits, quick and hard, 20, 57, 157  
 Words, 162  
 Work under fatigue, 53  
 "Writing up" notes, 231
- Z**
- Zeletikos*, 19





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